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Improvement in Machines for Molding and Pressing Brick.

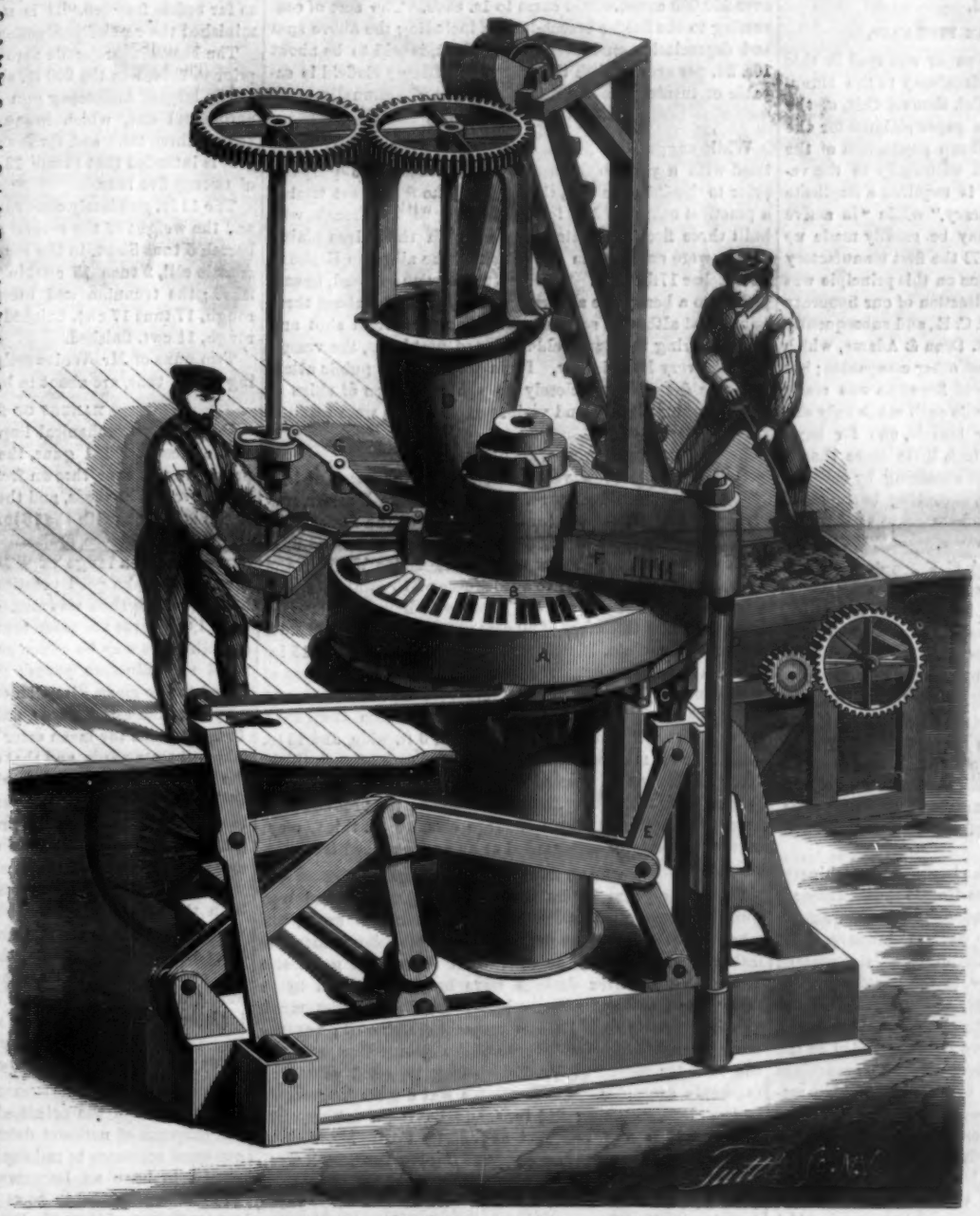
The proprietors of this patent state that it was the aim of the inventor to produce a machine with as few parts as possible, which could be run night and day, in summer and winter, and could be constructed so as to preclude the necessity of frequent repairs. That this has been successfully accomplished is satisfactorily proved by the practical operations of the press.

This improved brick press, constructed to mold and press bricks, has a horizontal revolving wheel, A, in which are placed permanent molds, B, extending from the upper to the lower surface. In these molds are placed movable plungers, C, which are used for pressing the bricks. The wheel A, is made to revolve and pause, so that the molds, B, pass continually under the mixing cylinder D, from the bottom of which the clay is forced into the molds, B, and then over the toggle bar E, which, being straightened, presses the plungers C, up into the molds, the clay being retained by the fixed cover F, under which each mold passes and stops as the wheel A, revolves and pauses. When the bricks are pressed, the wheel A, moves round, and they are forced gradually out of the molds, and are swept off by an adjustment, G, on to a board H, or an endless belt, as may be desired. The clay is first ground by rollers, I, placed on the ground, and thence carried by buckets on an endless belt, J, into cylinder D, in which it is mixed by revolving arms which also force it into the molds.

Pressure by the toggle bar, considered in all respects, is the best known in mechanics. In this machine, it can be regulated with ease to suit the material used. This invention can be quickly adjusted to mold bricks of wet clay without pressure; or the pressure can be increased to hundreds of tuns for dry clay.

The bricks manufactured by this press, being of great density and tenacity, with sharp corners and angles, are superior to those made by hand, and equal in every respect to those produced by other machines. As they come from the press they can be handled without injury, and may be hacked under sheds, thus preventing the large loss that is incident to exposure in the open air.

This machine attracts especial attention by its simplicity; its cost and weight are only about one third of those of other machines claiming to do the same amount and quality of work; and the motive power required to work it is comparatively small. The press can be made "single" or "double," the capacity of the former, the proprietors state, being 25,000 bricks per day of ten hours, and that of the latter 50,000 bricks.



SHEPARD'S IMPROVED BRICK PRESS.

The following advantages are further claimed for this new brick press: It is the cheapest machine which has been offered to the public, that does the work of molding and pressing bricks; it accomplishes this work without change in the action of the machinery; the motion is continuous, no cessation of power being necessary after the machine is set in operation until the work is finished; it grinds and mixes the clay so that the bricks are uniform in density, and less liable to break in burning, thus obviating one of the most serious objections to pressed bricks; it is a self-delivering machine, requiring very little manual labor to run it; it is very durable and not liable to get out of order; the degree of pressure can be varied to suit the material used; the pressure exerted and the number of bricks molded are greater than that of other machines using the same amount of motive power; the machine is simple in its construction— any ordinary mechanic, or workman, can set it up, adjust and work it; it is of a compact form, and of much less weight than other machines claiming the same capacity, and can be readily adapted to make pressed fuel of fine coal or of peat.

This press was patented through the Scientific American Patent Agency January 8, 1867, and is owned by the "Combination Brick Press Company," of which George W. Quintard, Esq., is President. For further particulars address or call on J. M. Moorhead, Superintendent, at the Morgan Iron Works, foot of Ninth street, East River, New York City.

Improved Pavement.

Patented by H. G. McGonegal, of New York city. This invention relates to a new wooden street pavement, which is so arranged that the blocks in each row are connected with each other, so that not one can be forced down without the others also sinking; thereby the holes, now generally occurring in wooden pavements by the sinking of single blocks, will be avoided, and a whole, coherent wooden pavement will thus be provided.

The invention also consists in boring vertical holes into the blocks for the purpose of receiving sand, cement, or tar. The same will wear quicker than the wood, and the surfaces of the filling will, therefore, be lower than the face of the wooden blocks; thereby a sufficiently uneven surface is provided for the purpose of giving a secure foothold to the horses.

Machine for Exterminating the Cotton Worm, Etc.

Recently patented by Charles Steinmann, of Napoleonville, La. This invention consists, to state its nature in comprehensive general terms, of an ordinary steam boiler, that is provided with a novel arrangement of tubes or pipes for the distribution of the steam generated by it, in combination with a reservoir or tank to contain oil, which, in its turn, is supplied with mechanical appendages for the proper bestowal and distribution of the oil, the whole combination being placed upon a suitable frame or platform supported on wheels, in order that the machine may be easily portable or transportable in its operations against the creatures it is intended to destroy.

The boiler being supplied with a proper quantity of water, and the heater filled with water, and the oil reservoir with oil, the operation is as follows, to wit: Steam is raised and the machine placed in position to begin work between two rows of cotton, which we may suppose to be the two rows next one end or side of the field. The stop cocks are now opened, and as soon as the oil begins to flow from the jet pipes the machine is started. The steam, as it rushes out of its own series of jet pipes or nipples, passes through the dripping oil and expands and transforms the same into vapor, which, intermingling and spreading out with the steam and changing its character, envelopes the proximate rows of cotton plants, and kills every caterpillar or other insect upon them. It does more; its effect is so deadly that it destroys the eggs of the worm, and leaves an invisible influence upon every part of the plants that have been bathed with it, which keeps off those worms that, coming into the field from other quarters afterward, might otherwise prove as destructive as those that have been killed would have been if they had been permitted to live. This I have verified by prolonged and careful watching, and hence it will be seen that my invention not only will destroy the unhatched and living insects upon any given field, but that it will shield that field from all danger of depredation from such as may come into it from outside localities, and hence, further, that upon its general use, it will finally exterminate every tribe of insect, and relieve the country of the anxiety and heavy loss they have heretofore every year inflicted. But to return to the operation of the machine; after two rows have been covered with the vapor, the machine is carried across the field between the next two rows of plants, and so on until it has been made to traverse the whole field, and envelope every plant in it with its oleaginous vapor, and then its work for the season is accomplished, and the crop saved on every foot of ground over which it has passed.

My invention may be of any prescribed dimensions, to be drawn by one or more mules or horses, and there is no need to make it of costly construction. Any cheap oil may be employed, such as petroleum, lard, or cotton-seed oil, or the like, care being taken that no acid is contained in it. Those oils that give out the strongest and most disagreeable odors are, perhaps, the most effective.

HARMLESS "PHARAOH'S SERPENTS."—A new method of making the curious chemical toys called Pharaoh's Serpents has been suggested by Vorbringer. The black liquor which results as a useless product when coal oil is purified with sulphuric acid, is to be treated with fuming nitric acid. The dark-colored resinous matter which swims on the surface is then collected, washed and dried, when it forms a yellowish-brown mass having about the consistency of sulphur which has been melted and poured into water. When this mass is ignited it undergoes such a wonderful increase in bulk that a cylinder one inch long will give a snake about four feet in length. The briefness of the popularity enjoyed by the "original" serpents was due to the unhealthy vapors given off in the process of burning.

THE BRITISH INSTITUTION OF CIVIL ENGINEERS.

This most useful society celebrated its fiftieth anniversary on the 2d of January last, when the new president, Mr. C. H. Gregory, made an able address, full of much useful and valuable information. We subjoin some extracts from this address, in which, among other things, the history, influence, and introduction of American inventions and engineering practice in England are noticed:—

Fifty years ago, on the 2d of January, 1818, this Institution was founded, its members then being only six in number. On the 21st of March, 1820, Thomas Telford, our first president, in his inaugural address, referred to the nature of the Institution and its probable future usefulness, and pointed out the significant fact, that while in foreign countries, such institutions depended on governments for their support, in this country their existence and their prosperity were dependent on the united action of the individual members. In this, our jubilee year, we may, with pardonable pride, congratulate ourselves that Telford's views have been justified, and even surpassed, in succeeding years of increasing prosperity, in our satisfactory financial condition, in our numbers, now comprising 1,472 members of all classes, in the formation of our student class, and our benevolent fund, and in the firm establishment of the Institution of Civil Engineers as the recognized representative body of the profession, comprising within its ranks, past and present, the names of so many illustrious in abstract or practical science, whose labors have enlarged the resources of our country and materially promoted the civilisation of the world.

INTRODUCTION OF AMERICAN FIRE-ARMS.

On the 25th of November, 1851, a paper was read in this Institution "On the Application of Machinery to the Manufacture of Rotating Fire-arms," by Col. Samuel Colt, of the United States Assoc. Inst. C. E. The paper claimed for the machinery used the advantage of cheap production of the weapons in large quantities, and such uniformity in the various parts that "when a new piece is required a duplicate can be supplied with greater accuracy," while "in active service a number of complete arms may be readily made up from portions of broken ones." In 1852 the first manufactory in England for the construction of arms on this principle was erected at Thames Bank, under the direction of our honorary secretary, Mr. Charles Manby, M. Inst. C. E., and subsequently a manufactory was erected by Messrs. Dean & Adams, which in later years passed into the hands of other companies; but prior to this time the construction of fire-arms was really carried on by small manufacturers, who each made only one separate part—one for locks, one for barrels, one for bayonets, etc,; the gunmaker being, in fact, little more than a setter up; and the government, after obtaining by contract the separate parts of their muskets, excepting barrels and some small parts, from separate manufacturers, put them together at their own works at Enfield.

In 1853, Mr. John Anderson, M. Inst. C. E., engineer to the Board of Ordnance, proposed the construction and equipment of a government manufactory, in which, by the use of complete machinery, all the processes for the production of small arms should be carried on successively to completion. In 1854 the subject was considered by a select committee of the House of Commons, and the adoption of machinery, as recommended by Mr. Anderson, was advocated by Mr. Jos. Whitworth, M. Inst. C. E., Mr. James Nasmyth, Gen. Tulloch, R. A., and other officers and engineers; and, in spite of the views of those whose habits or prejudices led them to oppose a new system, the committee recommended a partial trial, which issued in the establishment of the present small-arm factory at Enfield.

This new factory, stocked with improved machinery, founded on that already in use in the United States arsenals at Springfield and Harper's Ferry, and made partly in America and partly in England, was set to work in January, 1857, under the direction of Col. Manley Dixon, R. A., the present superintendent of small-arm factories, in the construction of small arms generally but particularly of the Enfield rifle of the pattern of 1853, which, with trifling modifications, is the long rifle now used in our army, where not superseded by the Snider breech-loader [an American invention]. The machines used at Enfield are to a great extent varieties of copying machines, in which a standard model is reproduced by a revolving cutter, in wood or metal, as the case may require. The different parts, as produced, are checked with templates and gages, and finally the finished parts, stock, lock, barrel, bands, bayonet, plates, screws, etc., find their way in numbers to an "assembler," who, furnished with a screwdriver and a chisel, takes the parts up indiscriminately and puts them together; and so entirely interchangeable are the parts found to be that a payment of 3.29d. for each rifle put together gives the workman wages of about 50s. per week.

The long Enfield rifle consists of 53 parts, and passes through about 740 processes of manufacture. These processes are multiplied so as to simplify each operation, to divide the labor, and to require mostly only a cheap class of workmen. All parts, including the stock, are issued for repair in a finished state, any damaged part in a rifle in use can at once be replaced by a corresponding part without any fitting.

Up to the present time the government has had no contract for interchangeable arms, excepting one for 80,000 with the London Armory Company. The Birmingham Small Arms Company has, however, lately made interchangeable short rifles for the Turkish government. The cost of non-interchangeable long Enfield rifles with bayonets, under a contract made in 1859, was £2 18s. 6d. each, to which must be added the cost of the stock, 2s. 6d., and viewing expenses, 3s., bringing the total cost to £3 4s. each. It is stated that the average cost of the long Enfield rifles made at the government factory, including an allowance of five per cent on the cost of buildings and machinery, for depreciation, has averaged about £2 each. In 1859 a contract was entered into for short Enfield rifles, which, complete, and including stocks and viewing expenses, cost £4 14s. each. The cost of subsequently producing the same weapon at Enfield is stated to be £3 14s. each. Neither interest on capital nor profit are included in the government estimates here quoted.

It has been estimated that the improvement arising from the accurate work produced by good machinery, coupled with that arising from better ammunition, has resulted in reducing by 50 per cent the mean deviation in rifle shooting. The old smooth-bore musket was considered to make good practice if at 100 yards 75 shots in 100 hit a target 6 feet square. With the present service rifle and ammunition 100 shots can, at the same range, be placed in a space of 6 inches.

From January, 1857, to December 26, 1867, the total number of new arms made at Enfield was 616,828. The number of arms converted to breech-loaders on Snider's plan up to the same date was 175,550. On April 1st, 1866, an order was sent to Enfield to prepare for the conversion to breech-loaders of 40,000 arms; on July 1st this order was enlarged to 100,000; between July and September 10,000 converted breech-loaders had been sent to Canada, and by April 1st, 1867, the whole 100,000 had been supplied. The cost of the alteration of old machines and the supply of new ones for the purpose of the conversion has nearly reached £10,000, which, divided over 200,000 arms, would come to 1s. each. The cost of converting to the Snider breech-loader, including the above sum and depreciation on buildings and plant, is said to be about 16s. 3d. per arm. With the present machinery Enfield is capable of turning out about 130,000 new arms annually.

THE FIRST IRON-CLADS.

While suggestions had been made and partial experiments tried with a view to the use of iron for defensive purposes prior to the Crimean war, the credit of the first great trial of a practical nature is due to the Emperor of the French, who built three floating batteries cased with thick iron plates, which were engaged in the attack of the allies on Kinburn on October 17th, 1855. These batteries were exposed, unsupported, to a heavy fire at a range of 700 yards for about three hours, and although some casualties occurred from shot and shell entering the large old-fashioned port holes, the vessels received very little injury. From this date the public attention was drawn more closely to the protection of ships of war by armor plating, and various experiments were made in this country.

FIFTEEN-INCH WROUGHT-IRON PLATES.

During the last few years the size and thickness of iron plates have greatly increased. The plates of the *Warrior*, constructed in 1861, were 4½ in. thick; those of the *Bellerophon* are 6 in. thick, while the *Hercules* has plates of 8 in. and 9 in. thick at the water line. In France, the plates used for the navy have been increased to a thickness of 15 centimeters, or 6 in., and the *Marengo* and the *Ocean* will have at the water line plates of a thickness of 20 centimeters, or nearly 8 in. A wrought-iron plate, 14 ft. long and 6 ft. 6 in. wide and 15 in. thick, has been prepared for trial at Shoeburyness. Some of the principal English manufacturers (Messrs. J. Brown and Co., C. Cammell and Co., and the Millwall Iron Company), now offer to roll plates about 20 ft. long, 6 ft. wide, and 15 in. thick; but it may be doubted whether plates of such thickness and size can at present be so perfectly manufactured as to give their full proportionate resistance; the production of sound and uniform plates of large size, 10 in. thick, may, however, I believe, be regarded as an accomplished fact.

GREAT GUNS AND MORTARS.

For many years before the Crimean war, brass and iron guns had been made with very little change of form; but when public opinion was drawn to the application of mechanical improvements to the production of guns of great size and strength, clever designs were brought forward by so many that I will not attempt here to give even a list, much less to assign to each its due proportion of merit; but the large wrought-iron Horsfall gun of the Mersey Company, and the monster mortar of Mr. Mallet, may be cited as two remarkable examples. The Horsfall's was a smooth-bore gun, in one piece, weighing 21½ tuns, and having a caliber of 13 in.; and it is now mounted at Tilbury Fort. Mr. Mallet's mortars were compound, weighing forty-one tuns, with a caliber of 36 in., from one of which, with a charge of 70 lb. of powder, a shell weighing 2,395 lb. was thrown 2,759 yards, burying itself eight yards in the ground on its fall. The limited practice with this mortar was interrupted by the fracture of a tie-bolt; but it is greatly to be regretted that no further experiments have been made with it, or with the second piece, which has never been fired.

BREECH-LOADING CANNONS.

You will all remember that in 1860 breech-loading rifled guns were the order of the day, and that neither brass nor cast iron, as materials, were considered to fulfill the necessary conditions. The designs which had earned the greatest consideration, both from the government and the public, had been produced by those two distinguished members of our body, Sir William Armstrong and Mr. Whitworth; and as far as the construction of the guns was then concerned, the leading points of difference were, that while the Armstrong gun was built up of several rings or tubes of coiled wrought iron shrunk over one another and over a steel lining, with small grooves to take a soft-coated projectile, the Whitworth gun was built up of tubes of mild steel, forced with a taper over one another and over a steel lining, the bore being polygonal, with a hard, mechanically-fitting projectile.

ENGLISH CANNON AS NOW MADE.

Irrespective of breech-loading, which has been abandoned in this country for heavy guns, and of rifling, in which the original mode has been to a great extent superseded by larger grooves to guide soft metal studs fixed on a hard metal projectile, the gun now generally manufactured for the service has undergone considerable structural changes, the most material one being the diminution of the number of parts, and the substitution of outer coils of fibrous Staffordshire iron for coils of the best Yorkshire iron, tough steel being still maintained for the lining, as best resisting surface wear. In the former type of gun there was a forged breech-piece over the breech end of the steel lining tube, and, according to the size of the gun, a greater or less number of coiled tubes, carefully and successively fitted on. The pattern at present in use for all guns consists of only four pieces, viz: 1st, the steel barrel, or lining; 2d, a coiled tube over the barrel, extending from the muzzle nearly to the trunnions; 3d, the breech coil, consisting of three coils in alternate directions, welded together, with a trunnion welded on, the whole piece shrunk on over the breech of the barrel, and lapping over the front coil; 4th, the cascable. It is considered by the present authorities that the diminution in number of parts leaves the gun less liable to injury by accident, and less dependent upon perfection in manufacture, and that practically an equal amount of strength is obtained; while it is held that a fibrous iron is to be preferred, as more workable for coils, and as giving out its greatest strain over a greater distance than the best Yorkshire iron, which, while strong statically, is considered not to yield so far before fracture. It is stated that this change has diminished the cost of production by 35 or 40 per cent.

The heaviest projectile thrown by any gun in the service prior to 1854, was the 200 lb. shell of the 13 in. mortar.

The largest Armstrong gun hitherto constructed is an experimental one, which has a caliber of 13·1 inch, weighs twenty-three tuns, and throws a shell of 600 lb.

It is intended that future 12 in. guns shall have a weight of twenty-five tuns.

The 11 in. gun lately constructed weighs twenty-three tuns, and the weight of the several parts are as follows: The steel barrel, 5 tuns 5 cwt. in the rough, 2 tuns 16 cwt. finished; the muzzle coil, 2 tuns 15 cwt. in the rough, 1 tun 16 cwt. finished; the trunnion and breech coil, 22 tuns 6 cwt in. the rough, 17 tuns 17 cwt. finished; the cascable 14 cwt. in the rough, 11 cwt. finished.

Two guns of Mr. Whitworth's, of 9 in. caliber, and weighing fifteen tuns, are about to be delivered for trial.

RANGES OF PROJECTILES.

Prior to the mechanical improvements which have led up to the present rifled guns, the greatest distance to which a projectile was ever thrown from a smooth-bore gun was not much over 6,000 yards, and the limit of bombarding range at high elevations, with the 13 in. mortar was 4,500 yards. With the modern ordnance, projectiles have been thrown with greater precision to a range exceeding 10,000 yards; the guns of the service make good practice at 6,500 yards—in fact, much better practice than was formerly attainable at 3,000 yards.

At 1,000 yards the mean error of range of round shot from smooth bores may be taken as forty-three yards, and that of rifled shot nineteen yards; the mean error of direction (referred to the mean direction of all the shot) with round shot may be taken as 4.1 yards, and with rifled shot as 0·8 yard. At 2,000 yards the mean error of range of round shot may be taken as sixty yards, and that of rifled shot twenty-one yards: the mean error of direction with round shot ten yards, and with rifled shot twenty-one yards. In other words—the accuracy being inversely as the products of the errors—the rifled gun is in one case more than eleven times, and in the other more than thirteen times, as accurate as the smooth bore.

I may be allowed to express my belief that great as have been the advances made in the manufacture of heavy ordnance in France, in Prussia, and in the United States, neither have attained the certainty, the economy, or the perfection, of the productions of British factories. But all our improvements will be of little avail in time of need until smooth bores are much more largely replaced by rifled guns. Meanwhile, for all practical purposes, we are almost unarmed in many of our so called defenses at home and abroad.

RAILROADS IN WAR.

Any notice of the principal application of engineering to the purposes of national defense would be incomplete without some reference to railways, which have always been expected to have an important bearing on modern warfare. They were admitted to be of great use in the movement and concentration of troops in the war in Lombardy in 1859; and in the German war of 1866 the Prussian government organized a special corps consisting of workmen and railway servants, under the direction of engineers and traffic officers, of which a division was attached to each *"corps d'armée,"* to act, assisted by a military escort, in advance of the army, to repair any damages effected by a retreating enemy, to work lines occupied by the army, and in case of retreat, to destroy lines in their rear.

Lieutenant Hozier, in his admirable account of the Seven Weeks' War, admits the value of improved roads and railways in shortening the duration of campaigns, and especially in facilitating the transport of provisions, stores, and a siege train, and in relieving soldiers of heavy loads; but he considers that the power of railways for the support of troops has been over-estimated, and that in an enemy's country railways have been proved to be of no use for the transport of the troops of the invader during his advance, as the defending army breaks them up, and they cannot be repaired quickly enough.

AMERICAN RAILROADS OPERATING DURING THE WAR.

I cannot but think that Mr. Hozier's views of the carrying

capacity of railways might have been modified by the knowledge of what is done on the volunteer field days in this country, while his opinions on the uselessness of railways in an enemy's country are apparently inconsistent with the experience of the last American war.

In that war railways and steamboats were found of inestimable advantage. The reports of General Parsons, chief of rail and river transportation for the United States, show that he considered the application of steam to transport had modified the art of war as much as the pursuits of peace; and he stated in 1865, as the result of his experience, that "it is now practicable, on twenty-four hours' notice, to embark by railway, at Boston or Baltimore, a larger army than that with which Napoleon won some of his most decisive victories, and landing it within three days at Cairo, 1,200 miles distant, there embark it on transports, and within four days' more time disembark it at New Orleans, 1,000 miles further." In January, 1865, in the depth of a severe winter, the 23d army corps was wanted for General Grant's operations before Richmond. After four or five days' notice this force, consisting of 20,000 men, with all its artillery, and over 1,000 animals, was started from the Tennessee river, and moved nearly 1,400 miles in an average time not exceeding eleven days. The distance was about equally divided between water and railway transport, along rivers obstructed by fog and ice, and over mountains during violent snow storms, with various interruptions, including thirty hours' detention from fog in the river, and at one point the unexpected delay of transferring the troops to boats of a smaller class, the railroad, meanwhile, being in the bad condition unavoidable in the severe winters of North America. Within seventeen days from the embarkation of the first troops on the Tennessee, General Parsons had the satisfaction of seeing the army quietly encamped on the banks of the Potomac, as fresh as when they started from Tennessee.

During the war, 611 miles of railway in Virginia, Maryland and Pennsylvania, 293 miles in North Carolina, and 1,201 miles in the military division in the Mississippi, giving a total of 2,105 miles, were more or less occupied by the United States authorities as military railways, under the direction of General M'Callum, the government staff carrying on all the working of these lines, and repairs of works and rolling stock, and to some extent the rolling of rails and the construction of new lines. At an early period a number of workmen, under competent engineers and foremen, were formed into a "construction corps," and stationed in detachments along any railway exposed to hostile attack, and stores were established at intervals to furnish the necessary supplies of rails, fittings, sleepers, and bridge timber.

HOW THE YANKEES BUILT BRIDGES.

This corps became at last very experienced in the work of repairing damage. General M'Callum's reports state that the Rappahannock river bridge, 625 ft. long and 35 ft. high, was rebuilt in nineteen working hours; that Potomac creek bridge, 414 ft. long and 82 ft. high, was built in forty working hours; that Chattahoochee bridge, 780 ft. long and 92 ft. high, was completed in four and a half days; that between Tunnel Hill and Resaca twenty-five miles of permanent way and 230 ft. of bridges were constructed in seven and a half days; and near Big Shanty thirty-five and a half miles of permanent way and 455 ft. of bridges in thirteen days. The last of these remarkable operations took place on the line by which General Sherman was connected with his base, in his advance from Chattanooga to Atlanta; and that the Military Railway Department, almost entirely through a hostile country, should have kept pace with the march of General Sherman, constructing and reconstructing the road in his rear, and ultimately have maintained the supplies of an army of 100,000 men and 60,000 animals from a base 360 miles distant, along a single line, exposed at all times to the attacks of an active and resolute enemy, is indeed a wonderful example of forethought, energy, patience, and watchfulness.

EDITORIAL CORRESPONDENCE.

NAPLES, Jan. 28, 1868.

Vesuvius—A Novel Spectacle of Neapolitan Life—Herculaneum and Pompeii.

Naples, apart from the extraordinary beauty of its situation, its rich museum and splendid churches, does not possess many objects to long detain a tourist; but in the number and variety of its excursions east and west, it offers more attractive features than any other city in Europe. From my youth up I have cherished a desire to visit Vesuvius, Pompeii, and Herculaneun, and to have had that wish gratified fully repays me for all the toils of a journey of four thousand miles. I have seen Vesuvius by dull star light, with its cone all on fire, vomiting streams of red-hot lava, which flowed down its sides like rivers of fire, and casting its dense clouds of smoke and its lurid light upward to the sky; again, on the second night, the appearance still more brilliant and the volume of lava considerably increased, but grander still was the effect of a visit to the mountain by night. Numerous parties go down every afternoon in carriages, as far as the village of Resina, which stands above the spot where Herculaneun lies buried eighty feet below the surface. Here we engaged horses and a guide, and some torch bearers, and thus provided made our way up the mountain near to the crater of the terrible eruption of 1858, which continued nearly three years. The afternoon being clear and still, we were favored with a fine view of the city and bay of Naples, the Castle of St. Elmo high above it, the isles of Capri and Ischia in the bay, and a range of the snow covered Appennines far to the north, while just above our heads rose the awful volcano, with its overflowing streams of liquid fire, and as often as every thirty seconds would a shower of stones be thrown upward hundreds of feet into the air, the shower succeeded by a heavy, rumbling sound, like the distant fire of artillery—certainly a grand and terrifying spectacle. We proceeded on horseback as far as the guide would permit, with sticks in hand, "to try the lava," as the people say when they urge you to buy them. We made our way up one of the principal streams by passing for some distance over the blackening crust of fresh lava, which but three days before was moving down the mountain like molten iron running from a furnace, and was still red hot underneath. At this point, and under cover of the night, we could take at one view not only the eruptions from the crater, but also the several channels through which the lava was working its way down the sides of the mountain, already covered with the blackened masses of former eruptions. We happened to see Vesuvius in one of its most angry moods, and I do not think any of our party will ever forget the sight, and yet no one seems to fear this burning mount. The inhabitants of Naples, and the towns along the base of the volcano, live, eat, and sleep, regardless of the fate of cities that lie buried under its ashes.

The road to Pompeii runs along the eastern bay of Naples, and through a continuous line of villages, whose inhabitants appear to live upon macaroni, if one may judge from the immense quantities of this article hung out to dry. Almost every house has its string of macaroni poles hung out in front, and the people who make it are often so dirty that it is almost impossible to distinguish their features. Pigs are sometimes seen walking around under the pendant links, to say nothing of the dirty urchins who are permitted to handle it. I have heard it said that a lazaroni would keep fat on a daily diet of two cents' worth of grapes and macaroni, but it appears now that the latter article is a luxury which the lazaroni don't enjoy in such abundance.

The roadway from Naples to Pompeii was lined with the strangest assortment of men, beasts, and vehicles, that human eyes ever looked upon. Here is a vehicle or go-cart, resembling a long furniture truck, suspended on a pair of tall wheels, upon the platform of which is fastened what very much resembles an old-fashioned doctor's gig, with covered top thrown back, hung upon double C-springs The seat is occupied by a priest and a fat woman; while behind and underneath the top, sitting on the platform, are two old vegetable women just returning from market. Four men, with red caps, dressed in brown duck trowsers, and short sacks or tunics, are standing up behind, holding on to the gig-top. One is a lazaroni, exposing a pair of legs that might serve for an Apollo. In front, beside the driver, are seven men, who are either sitting or standing upon the platform; the whole load being drawn by one little horse, with a fancy top-knot, and carrying upon his back a huge saddle, provided with three long horns most fantastically ornamented in brass—the center horn carrying a turret of bells and a wind vane. The shafts of the vehicle pass obliquely along the sides of the little animal, and fasten to the saddle a little above his back by a heavily stitched leather band, which slides through openings or grooves cut in the top of the two outer horns. Here is another heavy cart, loaded with cabbages; the skeleton form of a large white ox is yoked between the heavy shafts. On one side of the ox is a little horse, a cow, or a mule; on the other, a small donkey, fastened to the cart by ropes and whiffletrees, to assist in hauling the load. Here is another immense load of carrots, macaroni, or salt cod-fish, drawn by a horse, mule, and donkey, working abreast. Here, again, is a small, open, two-wheeled gig, drawn by a donkey, or a very small horse; the rider is a full-grown man, who jogs along apparently indifferent of the cares and opinions of the world. There is a woman trying to drive a black pig, having a rope tied around his body, and is very nearly being run down by an elegant carriage with fine horses and liveried servants, while all along the sidewalks, fronting the houses, and covering church steps, are to be seen lazaroni sunning themselves; women washing, cooking, spinning from the distaff, examining their childrens' heads, or having their own attended too; half-naked boys running after our carriage, pounding their chins to attract our notice; and beggars, plenty, old and young, sick and sore—the whole constituting an actual scene of every day life along the shores of the bay of Naples, and no mere fancy sketch of a letter-writer. Beggary is reduced to a science in Naples, and we witnessed many singular and disgusting forms of it which suggested a most wretched form of society.

Herculaneum is still a buried city, and but little is known of its extent, except what can be conjectured by the discovery and partial excavation of a theater of very solid construction, and capable of seating 8,000 people. This structure was accidentally discovered during the process of digging a well eighty feet below the surface, and some fine marble statues were found which are now at the museum at Naples. All hopes of knowing anything more of this buried city of the dead are forever lost, as a modern city stands above it, and this may some day share the same fate.

Pompeii, of which the world already knows so much, lies buried upon an open plain, and it is estimated that about one fifth of the city has already been uncovered. It is a strange and melancholy sight to walk through its well paved streets, still bearing the marks of vehicles, worn more than two thousand years ago; and amidst ruined heathen temples, amphitheaters, forums, theaters, palaces, houses, mills, tombs, and other structures, which speak of a people who cultivated many of the refined arts and customs of our Christian civilization.

The museum of Naples contains a very extensive collection of objects of art and utility, dug out of this overwhelmed city; and the work is still going on, though slowly, under direction of the government. As I wandered about through the ruins of Pompeii, I could not resist the conviction that all the objects which have been dug up ought to have been kept where they were found, thus forming the grandest and most interesting museum in the world. S. H. W.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Canal Navigation---Steam Power and Enlargement of Locks.

MESSRS. EDITORS:—Having had some experience in building canals in this country and in Canada, and seeing considerable discussion going on in your State Convention respecting the New York canals, with your leave I will venture to make a few suggestions respecting them, not that I am silly enough to suppose I can effect any particular change in their management; but if I should happen to let fall even *one* idea that will benefit the people of your Empire State, I shall feel amply rewarded.

One great obstacle to the expeditious navigation of the Erie Canal is the numerous locks and the great length of time required to pass the boats through them. To obviate this difficulty, I would suggest the lengthening of the locks to eight hundred or one thousand feet by removing the gate at the upper end of the lock, and then extend the lower level by excavating the 800 or 1000 feet, at which point let the upper part of the lock and gate be put in as it was before. It will readily be seen that instead of locking one boat at a time, six, eight, ten, or more, could pass at the same time. Of course the sluices could be correspondingly increased, to give the water the same free passage it now has in the short locks. Wherever the fall is too precipitous, in order to carry out the foregoing, it will only be necessary to extend the length of the canal by a more circuitous route, thus lengthening the grade also.

Another obstacle to expeditious navigation by the canal, is the present method of towing the boats, which is not only slow but expensive. To obviate this, I would suggest the laying of a railway track on the present "tow path," and tow with locomotive engines. If a double track should be thought too expensive, double switch "turnouts" could be put in at each mile, or as often as necessary, which would be short, as only the engine and tender would require to occupy them. It is estimated that a forty-ton engine, with small drivers, will tow thirty boats at the rate of two and a half miles the hour. Suppose one-sixth of the time should be occupied in locking, the engine would take the thirty boats from Buffalo to Albany in about seven days—no small saving of time, to say nothing about expense. At this slow rate of speed, the wear on the track and engine would be scarcely perceptible.

At the present high prices for labor and fuel, the cost of running such an engine would not be over thirty-two dollars per day. For the seven days it would be $224, or a little less than eight dollars to tow each boat from Buffalo to Albany, and *vice versa*. The expense of towing, in such a case, would be added to the canal tolls; and the freighter would only have to furnish and man his boat.

By running the engines at a uniform rate of speed, it will be difficult to estimate the number of "trains of boats" that could be taken through at the same time.

The "tow path" of the canal being ready for the superstructure, or nearly so, the expense of this method of traction would only be the ties, iron, engines, water tanks, and engine houses.

The plan of lengthening the locks here suggested is a very different thing from "enlarging" them; as, after the excavation is made, the same gates, stone, etc., can be used that would be taken from the upper end or half of the short locks.

I am clearly of the opinion that there is no economy in moving freights on a canal, where horse-power is used, by enlarging the boats, and consequent increase in width of the locks, for the displacement of water is in proportion to the size of the boat; consequently the horse-power must be increased if the boats are enlarged. As for towing by steamboats or tugs, I believe it is an admitted fact, that in our shallow canals it is impracticable.

According to the foregoing estimate one engine would make two round trips from Buffalo to Albany per month, taking thirty boats, each way, each trip. This would be 120 boats taken through the canal per month. For the seven months of navigation it would give 840 boats as the work of one engine. At this rate 100 engines would move eighty-four thousand boats through the canal once during each season of navigation. Supposing each boat were to carry two hundred tuns of freight, it would amount to sixteen million eight hundred thousand tuns per season.

I am entirely convinced, if this plan of working the Erie Canal were adopted, there would be no necessity for building a ship canal around the Falls of Niagara, on the American side, or the adoption of any other expedient to move the heavy freights from the West to your city as rapidly as they may accumulate. ENGINEER.

The Mysteries of Boiler Explosions and Railroad Accidents.

MESSRS. EDITORS:—"Cause unknown." This is a favorite verdict for a coroner's jury on accidents of all kinds. It has in some sort, taken the place of the old-time mortuary verdict, "died by the visitation of God," and is an easy escape from responsibility and a soothing salve to conscious incapacity or willful negligence. "Nobody to blame" is another comfortable and accommodating verdict in case of accident. These set terms are well enough for whitewashing purposes,

but will they forever satisfy the public? When on one single railroad eighteen broken rails are taken up in one day; and on another the train stops four times in less than ninety miles to have broken rails replaced by whole ones; and when it is found that a boiler which exploded had ten out of fourteen head stays broken off for weeks before it blew up, it is about time that either intelligent mechanics and engineers be placed on these juries of inquest or the farce itself be omitted. Your paper has always denied the necessity of attributing boiler explosions to mysterious causes, and I sincerely hope you will continue as heretofore to expose the pretensions of self-sufficient charlatans. B. F. G.

New York city.

Onions and Epidemics.

MESSRS. EDITORS:—In the spring of 1849 I was in charge of one hundred men on shipboard, with the cholera among the men. We had onions, which a number of the men ate freely. Those who did so were soon attacked, and nearly all died. As soon as I made this discovery their use was forbidden. After mature reflection I came to the conclusion that onions should never be eaten during the prevalence of epidemics, for the reason that they absorb the virus and communicate the disease, and that the proper use for them is sliced and placed in the sick room, and replaced with fresh ones every few hours.

It is a well established fact that onions will extract the poison of snakes; this I personally know. Some kinds of mud will do the same.

After maintaining the foregoing opinion for eighteen years, I have found the following well attested: Onions placed in the room where there is small-pox will blister, and decompose with great rapidity; not only so, but will prevent the spread of the disease. I think as a disinfectant they have no equal, when properly used; but keep them out of the stomach.

If need be, the foregoing (which I have greatly abbreviated) can be attested on oath. Let us have all the facts bearing upon the subject. JOHN B. WOLFF.

BEMENT & DOUGHERTY'S STEAM HAMMERS.

The illustrations in this article represent three of the different styles of steam hammers built by Messrs. Bement & Dougherty, of Philadelphia. The hammers are rated or classified according to the effective weight of the piston and hammer head or drop, and range from 100 pounds up to 10 tuns.

Fig. 1.

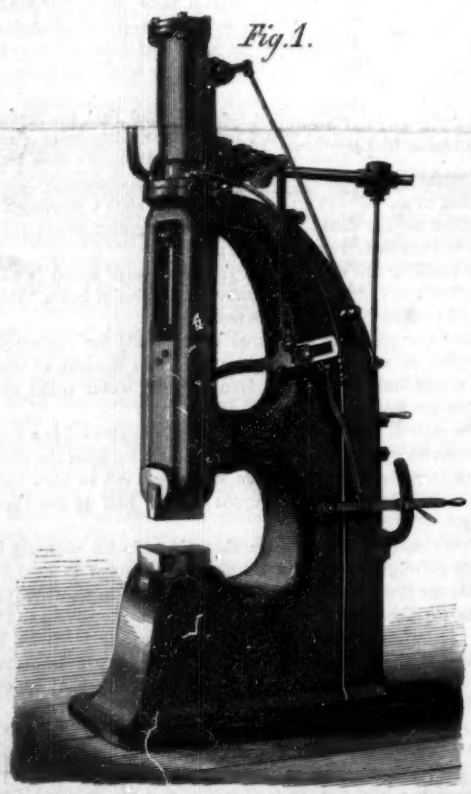


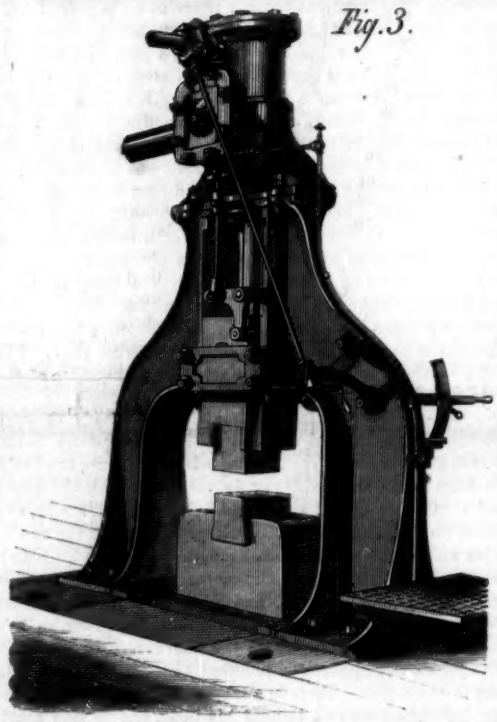
Fig. 1 is a perspective view of a 500-pound hammer, whose anvil and frame are cast in one piece, to which are bolted the cylinder, guides, etc. It is fitted with an improved valve motion which can be worked at pleasure, single or double acting, adjusting itself to all variations in the thickness of the forging, controlling the admission of steam so as to produce at will a short and quick or a long and slow stroke, and graduating from the light-cushioned blow to the "dead blow," in which no steam is admitted beneath the piston until after the blow is struck, thus utilizing the *vis viva* of the falling weight impelled by the top steam. It can also be used as an ordinary hand-working hammer without altering the setting of the gear.

Fig. 2 shows a 1,000-pound hammer whose frame is keyed and bolted to a massive casting which forms the anvil and base, and expands below the level of the floor to such an extent and mass as to absorb the concussion and thus enables the foundation to be of the least expensive character. The piston rod and drop are of wrought iron forged in one piece. The piston head is of steel and also the guide, which is so arranged behind the drop as to leave the hammer face and dies entirely clear for convenient working. It has the same valve motion as that of Fig. 1, the details, however, not being seen on the side presented, they being sufficiently shown in Fig. 1. Messrs. Bement & Dougherty do not, however, restrict themselves to these designs, but are prepared to build these sizes of hammers with separate anvils if desired.

The 1,500-pound, 2,000-pound, and 3,000-pound hammers being similar in design and differing only in dimensions, are sufficiently illustrated by Fig. 3. They have separate anvils and double frames which form the guides for the drop and the supports for the cylinder, etc. They are fitted with

Fig. 2.

Fig. 3.



balanced slide valves of superior construction whose variable and self-acting motion is produced by the well-known expedient of a rock lever operated by an inclined slot or groove planed in the hammer drop.

Owing to the improvements made in many minor features since the photographs were taken from which these engravings were prepared, they can be said to give a correct idea only of the general style or design of these hammers. [See advertisement on another page.]

History of a Rail of Bessemer Steel.

In the early part of the year 1857 a steel bloom was made by melting in crucibles Bessemer metal with spiegeleisen. This bloom was rolled into a double-headed rail, and in the spring of 1857 it was laid down at Derby station. On the 21st of December, 1867, ten years and six months after it had been laid down, it was reported to be apparently little the worse for wear. Now the wear amounted to, on an average, 250 trains passing over it daily, and a like number of transits of engines and tenders. Reckoning now the weight of each train at 100 tuns average, and that of engines and tenders at 20 tuns, we have an amount of 30,000 tuns per diem passing over this rail, and this continued for, say 300 days per annum, 10½ years, gives a total of 94,500,000 tuns. Now on the Canadian railways the iron rails are worn out by a traffic ranging from 4 millions to 30 millions of tuns, according to the quality of the iron rails. The Derby rail, therefore, of Bessemer steel, has already sustained more than three times the amount of traffic which suffices to destroy the best iron rails, and, in spite of this, it is still "apparently little the worse for wear." The opponents of steel rails will argue, no doubt, that this rail is an exception, and was better than other Bessemer steel rails, because the metal was remelted. Such, however, is not the fact, for steel is always more or less deteriorated by remelting; and the rail ends from Bessemer steel rails, made at Crewe, and therefore, of course, the rails themselves, are of as good and as durable a quality of steel as this Derby rail. ROBERT MUSHET.

Science Familiarly Illustrated.

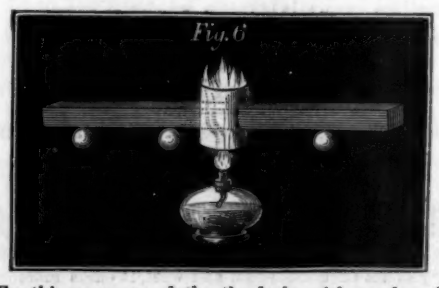
HEAT AND COLD.

BY JOHN TYNDALL, ESQ., LL. D., F.R.S.

Lecture IV.—Continued.

I have now to say a few words upon another subject—the propagation of this thing we call heat—this curious quivering motion of the atoms of bodies; and in order to make this evident to you, I will, first of all, make an experiment or two on liquid bodies, or on gases. I want you to understand the manner in which heat distributes itself in gases, and, for that purpose, I have here placed a little piece of platinum wire—that metal which we raised to a bright white heat in our first lecture. It is a refractory metal, and bears a very large amount of heat. Now, we will have the room made dark, and Mr. Chapman will excite our electric lamp, and I will ask you to look at the shadow caused by this little platinum wire on the screen. I trust that even the most distant young philosopher now sees that shadow. We will heat the platinum wire by an electric current, and you will observe two things. You see, first of all, that the platinum wire gets longer—swags, sinks down—when I heat it. Observe also the air rising up from the surface of the heated wire. That wave-like motion is due to currents of heated air rising from the wire. The air, when heated, rises in that way. The same is true of liquids; I have here a glass cell containing cold water, which will enable you to see this. I will place it in front of the lamp, and cast an image of it upon the screen. There is a means of warming this spiral of platinum wire within the water, and I want you to observe that the same thing occurs in water as you saw taking place with the air just now. Mr. Cottrell will now make the circuit for the electric current to pass; and then the moment the circuit is made you will find that the water will be heated by this spiral of platinum wire and the heated particles of water will rise to the surface of the liquid. There, on the screen, you see the action of the hot wire upon the water, causing the water to rise in these *striæ*. The water goes up from the heated surface, and in time the heated particles will distribute themselves through the entire mass of the water. I make this experiment in order to fix upon your minds the difference between this action and another which resembles it at first sight. The action which I have shown you receives the name of *convection*, which I should like the elder boys to remember, and I want you to distinguish between this and another process, which is a very different one, and which is called *conduction*. In order to illustrate this subject of conduction, I have placed here before you an iron bar and a copper bar (Fig. 6), and I want to ask them which conducts heat best. Mr. Cottrell will now light a lamp, and place it underneath the bars, so as to heat the ends of them at the same time; and as they become hot they will liberate these little balls, which are fixed on with wax; and I think you will find that the heat will travel along the copper better than along the iron. Here is a similar apparatus, with bits of tallow candle fixed to it. The greater the number of these pieces of candle that drop away from either bar, the further and better the heat has traveled through that body. This is almost a better experiment than the more elaborate one, and it is one which you can make at home for yourselves. The copper will be able to melt away all its candles, while the iron will not be able to do so. The whole philosophy of the clothes you wear is, that they are bad conductors of heat. Your bodies are sources of heat. Through the burning up of the food you eat, within your bodies, warmth is produced; and the object of the woolen clothes which you wear at the present cold season of the year, is simply to prevent the passage of heat from the body to the

Fig. 6



air. For this reason we clothe the body with woolen cloth, that being one of the worst conductors of heat in nature. But the cloth has no warmth in itself; if I want to keep ice cool, as I did in a former lecture, I wrap my ice in flannel, which prevents the heat from without coming to the ice. Thus the woolen cloth simply prevents the transfer of heat in either direction, and hence the value of these non conductors as articles of clothing.

The experiment with the pieces of candle sufficiently illustrates the fact that different materials differ in their power of conducting heat. I might also show you this in another way. If I warm this piece of iron by putting it into warm water, and then place it upon a cylinder of glass which stands on the face of the thermo-electric pile, that glass does not allow the heat to pass through to the pile, and the needle still remains on the side of cold. It would be a long time before the heat of this iron passed through the glass and reached the face of the pile. I will now remove the glass and place a cylinder of copper on the face of the pile, and then put the warm iron on the copper. I suppose that not more than two or three seconds will elapse before the heat will pass by the conduction of the copper to the face of the pile, and the moment it does so you will see that the needle will come to the other side of the middle line, showing heat. Now, in this

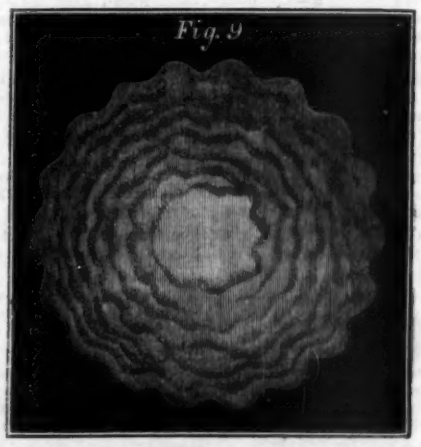
case, instead of having the heat transferred, as in liquids or gases, by the passage of hot masses through the remaining bulk, we have a transmission of heat from atom to atom of the copper; and this process, as I have said, is called *conduction* of heat, in contradistinction to the other process, which is called *convection*.

And now I have to go on to another subject of a somewhat different character; but in passing I must say a word upon a very useful piece of apparatus, the safety lamp, which, unfortunately, is not always wisely used. I will state the problem which the inventor of this simple, but very wonderful apparatus placed before him. You must know that in our coal mines the miners are prevented from using a candle to light them while at their work, in consequence of the quantity of gas which is in the air of the mines. In former times they used to employ a flint and steel, and work by the feeble light of the sparks. The problem which Sir Humphry Davy, the inventor of the safety lamp, set before him was this: "How can I give the miner light, and still preserve him from this explosive gas?" and he thought, "Can I put a light in any way within an apparatus so that, although the light shall shine through the apparatus, the gas outside will be prevented from exploding?" He found out that a flame could not pass through a piece of ordinary iron gauze. In fact, the flame is so much cooled by the wire gauze, in consequence of iron being a good conductor of heat and carrying the heat away from the flame, that the flame cannot get through. You see that when this iron gauze (Fig. 7) is placed over the

flame, the flame is entirely cut off, and cannot pass through; and if we light the gas above the gauze it will burn there, but the flame is prevented from reaching the gas below the gauze. (See Fig. 8). Now, Sir Humphry Davy, when he made the miner's safety lamp, surrounded the candle wick or the oil wick with a wire gauze; and, although the light can pass through the meshes of the gauze, you might have an explosive mixture within and without the lamp, but the flame inside could not propagate itself to the gas outside, being unable to pass through the gauze.

I come now to another subject, and a very interesting one. I will ask Mr. Cottrell to heat a silver crucible, or dish, almost to redness; and supposing I then pour water into it, what do you think will occur? You might at first say, "Well, the water will be converted into steam." That is not quite the case. You will find when I pour the water into the vessel that the heat of the vessel produces such an amount of vapor from the water, that the water is supported upon a spring or elastic cushion of its own vapor, and is thrown into the form of a sphere, and the water rolls about in its own vapor. In order to show you this effect, we will cause a beam of light to fall right into the silver basin, and that beam of light will illuminate the drop of water which we pour into the basin. The image of the interior will be then thrown upon the screen We now blow in a little water.

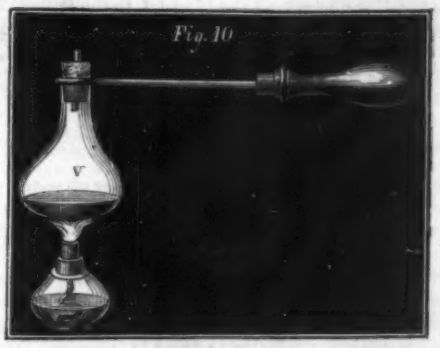
Now you see represented on the screen the globules of water rolling about—rolling about upon a cushion of their own vapor. Sometimes in this experiment we get a most beautiful figure produced by the water. We get a rosette form of globule. The vapor breaks away from the water in a kind of musical way. We will see if we cannot get the rosette form—a crimping of the edge of the drop of water.



[After a few seconds the rosette form occurred. See Fig. 9]. When the basin is not very hot, at first these little crimpings arise, and then, when the vapor is not sufficiently strong to lift the water out of contact with the basin, the water will come into contact with the basin, and will suddenly boil. There it is. [At this moment the spherical form ceased, and the water boiled up and immediately disappeared with a hissing sound]

I must now send Mr. Cottrell down stairs to prepare something of very great interest and beauty; but as I do not know whether the experiment will succeed or not. I do not wish to raise your expectation. If, however, it succeeds, the experiment will be a very useful and a very important one.

In the meantime I want to show you what may occur in consequence of this spheroidal condition of water on a hot surface. I have here a little copper boiler (Fig. 10). I will cork this boiler up, but I intend first of all to heat it very highly indeed, and then I will place a little drop of water into the boiler. I now heat the boiler, and Mr. Chapman



will hand me some hot water, and when the boiler is heated I will pour a little into it, and that water will roll about as a spheroid. Vapor will be given off, but being small in amount, while the water is rolling about it will escape through a small hole in the cork. I will then withdraw the boiler from the source of heat, and the drop of water will then come into contact with the hot boiler; steam will be generated, and I think that that steam will be sufficient to expel the cork into the atmosphere. [The experiment was performed with the result anticipated.] There you see the steam drives out the cork the moment the water becomes changed into vapor by contact with the hot surface of the boiler. In this way we may have very serious explosions, but that is a subject into which I cannot go at present.

I want now to make an experiment or two which shall illustrate the character of a certain substance with which I am now going to operate. I have had occasion to mention gases several times in these lectures. Now, gases and, in fact, the very air we breathe, are nothing more than the vapors of substances possessing very low boiling points. For instance, Mr. Faraday, to whom we are indebted for the very finest investigations upon this subject, succeeded in squeezing together the particles of the gas which is contained in this vessel, and forming it into a liquid; and there are other gases which have been liquefied by Mr. Faraday. One of them is a gas called carbonic acid, which we breathe out of our lungs. I want to generate a quantity of carbonic acid gas in this large round glass vessel. We have at the bottom of the vessel some bicarbonate of soda, and I have here an acid. If I pour the acid into the vessel it attacks the bicarbonate of soda, and we get this carbonic acid gas liberated. I dare say we shall presently have accumulated enough for our purpose. [After an interval]—Now let me see whether the gas which has been liberated has not the power of putting out a candle. This will show whether the gas exists in this vessel or not. [A lighted taper was lowered into the vessel, and was immediately extinguished by the carbonic acid gas therein contained.] Yes: there is the gas. You see it is incompetent to support the combustion of the candle. The vessel is very nearly full. Now I will show you that this gas is very much heavier than ordinary air. I might ladle it out or dip it out in a bucket, and if I did so in front of the screen you would see it fall like water from a vessel, although under ordinary circumstances it is quite invisible. But I want to show you its heaviness by means of a soap bubble. I will blow a bubble from this clay pipe, and allow that bubble to fall upon this invisible gas. You will find that the bubble will float about upon the surface of the gas as if it were floating upon the surface of a visible liquid. [Successive soap bubbles were then produced, and on being detached from the tobacco pipe, were gently dropped on the surface of the carbonic acid gas, and while floating there, were illuminated with electric light.]

Let me now tell you what I have sent Mr. Cottrell to do. Down stairs in the laboratory we have two very strong iron bottles, and these two bottles are filled with this carbonic acid. The gas in those bottles has been liquefied, and at the present moment he is turning a cock and allowing the liquid carbonic acid to turn into gas. What I want you to understand is that when the liquid carbonic acid turns into vapor it generates enormous cold, just as our vapor of water did on its production, only the cold generated by the carbonic acid is far greater. The consequence is, that when this liquid is turned into a gas and generates this cold, a portion of the vapor is turned into snow, and we thus obtain carbonic acid snow. I am almost afraid to speak to you about this matter, lest we should fail to get this wonderful substance. If I do get it I intend to put it into this vessel and make a few experiments with it which will both delight and surprise you. If we get the solid carbonic acid we shall be able to freeze water and produce ice in a crucible when it is actually heated to redness. First of all the carbonic acid snow is itself very cold, but in order to make it still colder I pour a little ether upon it. This turns it into a paste; and this mixture of carbonic acid and ether gives us nearly the greatest cold which has ever yet been produced. If we put that paste of carbonic acid and ether into the hot crucible, what occurs? The carbonic acid and the ether evaporate, and they so evaporate as to produce a protecting coating of vapor of carbonic acid between the red hot crucible and the pasty mass within it. In point of fact, the pasty mass does not touch the crucible at all. It remains intensely cold within the crucible. If we are successful in getting the solid carbonic acid, I shall dip this small brass sphere containing water into the mixture of ether and carbonic acid in the hot crucible; and I have no doubt that the water will freeze and will burst the brass sphere, and we shall then be able to take from the red hot crucible a sphere of solid ice. Mr. Cottrell is a long time bringing the solid carbonic acid. I am afraid he is not successful. Allow me simply to walk down stairs and see that the matter is going on rightly. [The lecturer then went in quest of the carbonic acid. On returning to the theater he resumed as follows]—I am sorry to say that my worst anticipations have been realized. The experiment below has has not succeeded. Here, however, is a little of this wonderful carbonic acid snow—solid carbonic acid. I will put a little in my mouth, and breathe against a candle. If I inhaled it I should kill myself; but I do not intend to inhale it. I intend simply to *exhale*. [The candle flame was then extinguished by the gas exhaled from the lecturer's mouth.]

TURNING A MOVABLE WHEEL AROUND A FIXED WHEEL.

"How many revolutions on its own axis will a movable wheel make in rolling once around a fixed wheel of the same diameter?"

This discussion continues with unabated interest and we are in receipt of a great variety of additional communications, with models and curious diagrams. Examination of the subject leads to study of the laws of motion, which becomes more interesting the further it is carried and is undoubtedly of benefit to the participants.

The two revolution philosophers may rejoice in the accession to their cause of Dr. Vander Weyde, late Professor of Mathematics and Chemistry, Gerard College, whose letter follows.

The editor of the Newburyport, Mass., *Daily Herald*, also appears as a two-revolution champion, and winds up a leading editorial as follows:—If the editor of the SCIENTIFIC AMERICAN "really needs any further light on the subject let him stand up face to face with another man of about his size—or a good looking woman—and revolve around him or her, and he will see that he will face the same side of the room *twice*, before he returns to his original position.

"The reason of the apparent discrepancy between a wheel revolving once to measure off its circumference on a plane and twice on a circle, is simply that in the latter case half of the motion is constantly wasted in space, so to speak, in getting round to the surface on which it is to revolve—'that's what's the matter.'"

Clear as mud that. If our cotemporary cannot do better the two-revolutionists will disown him. We would say to correspondents that we are always glad to hear from them; but of course we cannot publish every letter. We shall however endeavor to give every side a representation, and if a direct reply is not always given, correspondents will find their answer in some parallel representative case.

We still adhere to "one" and the majority of our correspondents coincide with us. We however take pleasure in giving a full and fair hearing to those who say "two," and for this reason make perhaps the most numerous selections from their letters.

MESSRS. EDITORS:—Let us suppose fixed wheels of different diameters and the case will become clear. First, let the fixed wheel be very small, commence with one infinitely small, a point; then a movable wheel turning around a point will have made exactly one revolution around its own axis when it has returned to its first position, no matter where this point is situated, it may be near the axis or near the circumference, inside, or even far outside the wheel. In the same manner the moon makes one revolution around its own axis when it turns once around the center of the earth. (In regard to the earth the moon makes, of course, no revolution at all around its own axis but she does so in regard to sun, stars and the rest of the universe.)

But when a wheel rolls in the same time around another wheel the effect of this rolling is added to its own rotation; however small this fixed wheel may be the moving wheel will make more than one revolution around its own axis; the number of these revolutions will depend on the relative size of the movable and fixed wheels; so when the fixed wheel is half the size of the movable it will make one and one half revolutions; if the wheels are equal the movable will make two revolutions, if the fixed wheel is twice the size the movable will make three revolutions, if three times the size four revolutions, and, in short, the movable wheel will always make one revolution more than the number expressing how often the size of the movable wheel may be divided into that of the fixed wheel.

It is scarcely worth while to exhibit wood cuts to illustrate these truths. Let any one who is not clear on the subject make the wheels out of disks of cardboard and rotate them rolling one along the other; it will serve him at the same time for a mental, geometrical and mechanical exercise, taking for his model the figure, page 67 (which is perfectly correct and demonstrates clearly the two revolutions), and making the wheels of different relative diameters the above-mentioned number of revolutions will be found to take place when rolling one around the other. P. H. VANDER WEYDE, M. D.

MESSRS. EDITORS:—I have just tried the experiment of a movable wheel revolving round a fixed wheel of the same diameter, and find it makes one revolution. I cut two wheels out of a thin piece of wood, made one fast, and from a given point on each rolled one around the other and one revolution is all I could make. It is astonishing what an amount of figures have been indulged in to prove the contrary while by a simple experiment they might prove "one" to be correct.

Camden, N. J HENRY M. TEST.

MESSRS. EDITORS:—About the wheel question: I would like to ask L. M. how many times the arrow head points to

ward the center of the fixed wheel in making one revolution around the fixed wheel? It points there but once and therefore the movable wheel makes but one revolution on its own axis. N. L. R.

Boonton, N. J.

Messrs. Editors:—A wheel rolling once around a fixed wheel of the same size makes two revolutions on its own axis: you say "one" but avoid giving a demonstration anxiously desired by your readers—you are not obliged to give it, but must stand by the consequences. I maintain the "wheel" makes two revolutions on its own axis, this I will demonstrate with your permission, in the Scientific American; but should you refuse my offers, then I would necessarily get the assistance of some other paper. An answer would oblige

Aurora, Ill. James Thierry.

In reply, if our correspondent will look at back numbers he will see that we have been engaged in demonstrating the subject for several weeks past. But it seems we do not progress quite fast enough for him; and he turns his wheel once too often for us. If he can write something interesting and short, we shall be happy to publish it.

W. E. H. replies as follows, to our comments on his article and diagram published last week:

"Until I received your paper of March 7th, I supposed that not only was I sound in the faith, but that my belief was known of all men.

"I most certainly hold that the movable wheel makes two revolutions on its own axis, while passing once around the fixed wheel. This I prove by showing that the index, *b*, secured to the movable wheel, points in every direction from its axis twice while passing once around the fixed wheel.

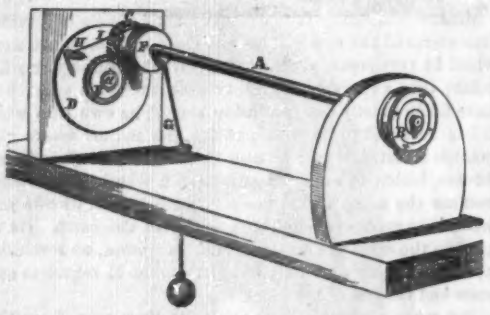
"With regard to the axis, I would say that an axis 'of a body' is 'that *line* about which the body revolves, or may be supposed to revolve.' It has no extension but length, and is no more capable of revolution than a cherub is of sitting down.

"If we once admit that an axis may be a cylinder, and revolve, such expressions as the earth's revolution *on* its axis every day, become absurd.

"For, if we suppose a pointer fastened to this so-called axis of the earth, near the pole, like the short pointer in the diagram of last week, it will turn with the earth each twenty-four hours. The earth, moving with the same angular velocity, the pointer will ever be directed to the same meridian; according to your argument the earth will not turn on its axis at all, seeing that, to turn over, it must have twice the angular velocity of the so-called axis. It was to avoid this difficulty that I used the word "bearing" so frequently in my letter. The axis of the wheel coincides with the central line of the bearing of which it is also the axis.

"Wm. E. H."

W. E. H. also sends us, from the office of the two-revolution philosophers, another very neat model illustrating their views, with the following note:



"Messrs. Editors:—Having leisure, I have made another machine to illustrate the question. The postulate here taken is, that when one end of a shaft revolves on its center or axis, the other does also. Two wheels, B C, are fastened to the opposite ends of a shaft, A, one end of which is pivoted in a movable disk, D, which rotates around a fixed wheel, E, of the same size as C; the shaft, A, being long and slightly inclined. The wheel, B, is to be turned by hand until it has made a complete revolution, when the opposite wheel, C, will be found to have moved but half way around the fixed wheel, E. Another turn of the wheel, B, will carry wheel, C, completely around E.

"I have, also, attached a pulley, F, to the wheel, C, on which a cord, G, may be rolled, and will be found to encircle the pulley twice in each 'orbit.'

"Middletown, Conn. W. E. H."

In reply to our correspondent's postulate, it is sufficient to say, that, because both ends of a shaft make the same rotation, it does not therefore follow that a wheel revolves twice upon its own axis, in rolling once around a fixed wheel.

The above diagram represents a device by which compound rotary may be converted into direct rotary motion, or *vice versa*. The axis of wheel, C, is carried in the rotating disk or carrier, D, which has its axis of motion at *a*; and by reason of the gearing together of C E (the latter being fixed) the wheel, C, is caused to rotate once upon its own axis for each rotation of the disk, D, upon its axis, *a*. These motions are both transmitted through the gear teeth; and a cord, G, hung upon pulley, F, or upon wheel, B, will be wound twice for each rotation of the disk, D, because the effect of both rotations, namely, the rotation of the carrier or disk, D, upon its axis, *a*, and the rotation of the wheel, C upon its own axis, are both imparted to the cord.

Now when we separate these two motions and allow only one of them, namely, that of the wheel, C, to act upon the cord, we shall then make clear to the eye the true and actual number of rotations of the wheel, upon its own axis, in rolling once around the fixed wheel, E.

In order to separate the cord from the effects of the rotation of the disk, D, we have only to set the cord spool, H, upon the disk and extend the thread, I, to the pulley, F; and now, on rolling the wheel, C, once around the fixed wheel, E, the cord will be wound up once, because the wheel, C, has rotated once upon its own axis.

Our friend's model and diagram practically illustrate the error of the two-revolution philosophers, and prove the correctness of those who adhere to "one."

Messrs. Editors:—Having been a reader of your valuable paper for twenty years except the four years that I was locked up in Dixey, I feel an interest in anything in which its opinions are opposed by any one, as I have always found them correct. I do not suppose that you need any assistance to show that you are correct on the wheel question. But as it is an open one, allow me to give my views on the subject. L. M., and others are trying to prove to the world that there is a wheel within a wheel; allow me to say that I am unable to see it. If L. M. will place a pin in the center of the fixed wheel and one in the center of the movable wheel and connect them by a strip or rod, and mark a point near the center of the movable wheel and pass the movable round the fixed wheel, he will find that the point marked will pass the connecting rod but once, therefore it makes but one revolution around its own axis, and one revolution around the fixed wheel, making two distinct revolutions. Samuel Hand.

Midville, Ga.

Messrs. Editors:—Here is a mathematical solution of L. M's problem. If a wheel three feet in circumference is rolled once around on a plain surface it, of course, accomplishes just three feet distance, the axis also has traveled just three feet indicated by the dotted line. Now when this wheel is rolled around another of the same size the axis will travel through a space of six feet, it being the circumference of a circle two feet in diameter.

Now for mathematics. If a wheel makes one revolution while its axis travels three feet how many revolutions does it make when its axis travels six feet? Ans. Two. Because six is twice as many as three. Surrender! all you "oneists" as gracefully as you may after such a persistent fight all on the wrong side. T. L. B.

Boston.

The question is not how far the axis travels, and we therefore decline to surrender.

Messrs. Editors: Referring to the diagram in your last Vol. XVIII., page 133, of H. Anderson, Peekskill, N. Y., if the loose end of the thread be held at the center of the fixed wheel, A (the only place to hold it), H. Anderson will find the thread wound only once around the shaft of the movable wheel, B. A. R.

Rochester, N. Y.

Messrs. Editors:—As a solution to the question, "How many revolutions does a wheel make on its own axis rolling around another of the same diameter once?" A. C. Sekell tries to prove that the wheel makes two. Mr. Sekell in his diagram makes the wheel turn a quarter of a revolution at each right angle of the square. But in doing this he changes the center. The second center is at the extremity of the diameter of the first circle. But in thus changing the center he destroys the first circle. Therefore the quarter of a revolution made by this circle cannot be added to the quarter of a revolution made by the first circle in passing over the first side of the square.

Again, to prove it mechanically, suppose a wooden block squared, the sum of its four sides equal to the circumference of a wooden wheel. Putting an axle in the wheel, let us commence at the first corner of the square; roll the wheel on its axle to the second corner. Thus far one quarter of a revolution has been made. Now let us lock the wheel; change the center to the tire of the wheel; on that center swing the entire wheel around the second side, and we are ready to make the second quarter revolution; yet the wheel has not revolved on its own axis, for the axle has been locked. Unlock the axle, and we can make the second quarter as before.

Newbern. P. W. T.

Messrs. Editors:—Every one seems to understand the wheel problem, but none seems to understand the cause of the difference of opinion. I think both sets of philosophers may congratulate themselves on being correct upon this question. The wheel makes one or two revolutions, according to the point from which it is contemplated. In relation to any point inside the circle scribed by the center of the moving wheel, it makes one revolution. In relation to any point outside of this circle it makes two. In relation to the sun, the moon revolves upon its axis. In relation to the earth, it is fixed.

Bristol. B. B. L.

It appears to us that both sides cannot be right. It is a question of fact, not of optical appearance.

Messrs. Editors:—If you want any wheels, to test "L.M.'s" principle with, we can send you a few dozen. Every one here has been manufacturing wheels for the last three weeks.

North Madison, O. H. R. S.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The extension of the Erie broad gage track to Chicago is no longer doubtful. The contract for the building of the intermediate connection of the Great Western with the Toledo, has been already made. This move has been demanded by the Western freight interest, on account of the high rates of the New York Central, the late advance being such as to prohibit the forwarding of freights further than Toledo. If the Erie directors had refused to meet the views of the railroad interest West, a junction would have been made with the Pennsylvania Central and the Baltimore and Ohio.

An English patent has lately been granted for an improved metal, from which it is claimed castings may be procured or steel manufactured in much less time and at a greatly reduced rate, than by other processes. After the ore is reduced in the blast furnace to the state of molten crude metal, the furnace is tapped, and the liquid metal runs off into a vessel or receptacle, when a blast of atmospheric air of a pressure of four pounds to the square inch, and upwards, is introduced into the mass through a hollow stirring rod. The effect is the driving off of the impurities, and the metal may run directly into molds, or steel of a fine quality may be procured by adding unmelted spiegeleisen or other compound of iron and carbon.

The new West Shore Hudson River Railroad is advancing with commendable energy, and the contracts for the first sixty miles will be closed this week. The negotiations for the purchase of the Northern New Jersey Railroad by this company have been successful, and the latter will enter upon possession shortly. The new road will connect with the proposed Midland line to Oswego and the Lakes.

California is rapidly extending her silk manufactures. It is announced that at the town of San José there has been started a silk manufactory with a capital of $100,000. The machinery has arrived, the foundations of the building are laid, and the worms are at work.

The Cheyenne papers claim that besides her gold treasures the territory of Wyoming proves to be very rich in the baser metals. Copper, iron, and lead are found in inexhaustible quantities along the base of the mountains for a long distance, from the Colorado line north. Good coal can be found all over the Laramie Plains, and in the same vicinity the discovery of oil and mineral springs has been reported.

The proposed Mexican Central Railroad, if built, will prove of the greatest benefit to that Republic. The design is to construct a road from the City of Mexico, four hundred and fifty miles, to Matamoras. From the Rio Grande to the Mississippi, supposing Vicksburg to be the objective point, is a distance of six hundred and forty miles. There is a road now running from Vicksburg west to Monroe, aiming at Shreveport, while an other is in progress from Houston eastward, aiming to touch both New Orleans and Baton Rouge. With the entire business of the best part of Mexico as a prize, both these roads would soon be completed.

The famous Comstock Lode, probably the most productive mineral vein in the world, is a strip of land only three miles long by 600 yards wide. The yield is valued at $12,000,000 annually. Five thousand men find employment in working it, and the produce for each workman is about $2,000 per annum. In 1865 there were forty-six companies working it, and they had excavated about twenty-eight miles of tunnels and drifts. The longest tunnel made is 3,200 feet; the greatest depth penetated is by the Gould & Curry, 821 feet.

General Palmer, the Treasurer of the Kansas Pacific Railway, has been exploring a route to the Pacific by the thirty-fifth parallel of latitude. He reports that rarely have they been obliged to resort to the maximum grade permitted by Congress, and on the highest summit on the route there will never be as much snow as on the Alleghanies; and for a summer and late autumn resort, there is not a finer spot on the continent than "President's Park," at that summit. If the company obtain the subsidy next spring, the road can be completed in four years' time.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Governor.—Ephraim P. Rogers, Corning, N. Y.—This invention relates to a new and improved method of constructing governors for steam engines and other purposes, whereby the same are rendered more effective in their operation, and whereby the expense or cost of a governor is materially lessened.

Frame for Carriage Tops.—James H. Flagg, Perkinsville, Vt.—This invention relates to an improvement in frames for carriage tops, intended for a top to be used as a substitute for an umbrella.

Churn.—C. H. Carver, Taunton, Mass.—This invention has for its object to furnish an improved churn, simple in construction, easily cleaned, easily operated, and which will do its work quickly and thoroughly.

Crib Attachment for Bedsteads.—Harriet Ruth Tracy, New York city.—This invention has for its object to furnish an improved bedstead and crib, so constructed and arranged that when the crib is not in use and is pushed into its place in the bedstead, the said bedstead and crib shall present a neat and uniform appearance, giving no indication of the presence of the crib attachment.

Self-raising Flour.—Wm. C. Hughes, Scio, Mich.—This invention relates to a method of preparing self-raising flour, and consists in a thorough and intimate incorporation of the fermenting principle with the flour when the grain is ground, in a certain proportion and at a low temperature.

Harness Pad Tree.—J. W. Hinman, Berlin, Wis.—This invention relates to the construction of a pad tree for gig, coach, or other harness, and consists in attaching the opposite sides or sections of the pad to a center piece by means of joints or hinges, whereby it is rendered flexible and self-adjustable to the back of a horse, yielding on one side or the other freely to his motion, and resting in an easy and comfortable manner.

Spring Bed Bottom.—E. E. Worden and H. Wilms, Brandon, Vt.—This invention consists in the use of elliptic springs or stays, and in the manner in which the upper frame is supported thereby, and also in the manner in which the spiral springs are supported and held in position.

Washing Machine.—P. F. Bindewald, Stronsville, Ohio.—This invention has for its object to furnish an improved washing machine, simple in construction, easily operated, effective in opuration, and which shall be made wholly of wood, so that there may be no danger of the clothes being injured by iron rust.

Securing Labels in Glassware.—Edward W. Davis, Pittsburg, Pa.—This invention relates to an improved method of securing labels of brass and other metallic bodies in glassware.

Animal Trap.—William Miller, Chicopee, Mass.—This invention has for its object to furnish a neat, simple, and effective means for catching rats, mice, and other animals.

Harness Motion for Looms.—James Greenhalgh, Sen., Woonsocket, R.I.—This invention has for its object to improve the construction of the parts of a loom, by means of which motion is imparted to the harness, so as to simplify their construction and make them more effective in operation.

Fastening Metallic Collars on Bottles.—Edward Wattis, Philadelphia, Pa.—This invention relates to an improvement in the method of securing metalic collars to the necks of glass bottles or flasks, whereby the same are securely fastened without cement, and are rendered durable and firmly attached while the bottle lasts.

Combined Boiler and Hot Air Register.—B. B. Perkins, Chestertown Md.—In this invention a boiler connected with the register is attached to the side or end of the hot air flues in houses, for the purpose of utilizing the heat conducted away by the walls of the flue and of supplying hot water to the upper rooms of the house.

Rice Planter.—Elijah Wagoner, Westminster, Md.—This invention is a machine for planting and covering rice, by which all the operations required in the planting of that article are as carefully and accurately performed as if done by hand, and by which one man is enabled to perform the work hitherto requiring the services of dozens of laborers.

Envelope.—Sigmund Ullman, New York city.—In this invention a new method of constructing, folding, and sealing the envelopes is employed, by which the use of adhesive gum is dispensed with, and when the envelope is sealed it is impossible for any one to open and close it again without leaving evidence of the transaction upon it.

Life-Saving Apparatus.—John B. Stoner, New York city.—This invention has for its object to furnish an improved apparatus by means of which

persons, when compelled to commit themselves to the water in case of accident on steamboats or shipboard may sustain themselves for days, or until they are rescured or reach a place of safety. Patented Feb. 4, 1868.

BALLASTING VESSELS.—John B. Stoner, New York city.—This invention has for its object to furnish an improved mode of temporarily ballasting a vessel, when necessary, by lowering weights into the water, so as to prevent the rolling or capsizing of said vessel. Patented Feb. 4, 1868.

MECHANISM FOR OPERATING STATIONARY MACHINERY.—Galusha Meranville, Hampton, N. Y.—This invention relates to a new arrangement of gear wheels, worms, cranks, and levers, for driving suction pumps, force pumps, and other suitable stationary machinery, and it consists in the general arrangement of gear wheels for obtaining the aforesaid object, and also in a new method of converting rotary into oscillating motion.

SCREW CAP FOR OIL CANS.—Wm. Rigg, London, England.—This invention relates to a new device to be applied to oil cans, in which kerosene and other oil is usually transported to foreign countries, so that the can may, when it arrives at its place of destination, be emptied without the loss of oil and without soiling the attendants.

TRIP HAMMER.—Charles Vogel, New York city.—This invention consists in a novel connection between the shank or stem of the hammer head and the beam through which the hammer head is tripped. Also in so constructing the beam carrying the hammer stem or shank, that it can be adjusted for raising the hammer head to a greater or lesser hight. Also a in novel combination and adaptation of springs imparting additional force and strength to the blow of the hammer, their combination and arrangement being such as to be susceptible of adjustment for a blow of greater or lesser degree of force and strength. Also in a novel arrangement of parts for arresting the motion of the hammer without requiring the driving mechanism to be stopped, the arrangement being such as to be self-operating when set free, and to arrest the hammer when at or near the end of its upward stroke or movement and there hold it, leaving the anvil exposed. And, finally, in an arrangement of parts upon the driving shaft of the trip hammer on which they are hung, to swing about and over its driving pulley, in combination with a treadle or other suitable operating lever, for the purpose of enabling the driving belt to be more or less tightened about the driving pulley, as may be desired, or found necessary in the running of the hammer.

MANUFACTURE OF BUTTONS.—Lewis Moses.—New York city.—This invention relates to a new manner of securing the eyes or loops of glass buttons to the body of the buttons, and consists in the use of liquid glass mixed with finely powdered glass or other mineral matter, by which a sheet metal plate to which the said loop is soldered, or cemented to the underside of the button, in which a recess has been formed for the purpose. This invention is applicable to all glass or porcelain buttons and ornaments, such as breastpins, etc.

TOY GUN.—S. Hubbard, Quincy, Ill.—This invention consists in the application of an elastic cord to a toy gun, in such a manner that it may be stretched or distended and held in a distended state by a catch with trigger attached, the cord being connected to a slide which works within the barrel of the gun, and all so arranged that by pulling the trigger, and thereby operating the catch and releasing the cord, the latter will, by its elasticity, eject the shot, or other missile, from the gun.

RAKING AND BINDING ATTACHMENT FOR REAPING MACHINES.—Christopher Lidren, Lafayette, Ind.—This invention relates to an attachment for automatically raking and binding grain, and is designed to be applied to reaping machines, and receives its motion from one of the driving wheels thereof.

SPRING ATTACHMENT FOR THILL COUPLINGS.—Kingston Goddard, Richmond, N. Y.—This invention consists in the application of a spring to a thill coupling, in such a manner that the jolting or jarring of the vehicle, the vertical movement of the pent axle, caused by the pent wheels passing over uneven surfaces and obstructions, will not be communicated in an appreciable degree to the thills of the vehicle, and the horse thereby relieved in the labor of drawing the vehicle, especially in traveling over rough roads.

THILL COUPLING.—Kingston Goddard, Richmond, N. Y.—This invention relates to an improved means for connecting the thills of vehicles to their front axles, and it has for its object the attachment of the thills in such a manner that the latter may be connected to and detached from the axle with the greatest facility, and when attached with the horse harnessed before the vehicle, casual detachment of the thills rendered impossible.

DUST PAN.—Samuel E. Condon, Brooklyn E. D., N. Y.—This invention relates to an improvement in dust pans for taking up dust, sweepings from floors or carpets, etc., so that the latter may be carried around a building from room to room, and the pan used and the dust deposited in the chamber until the latter is filled, when the dust chamber may be readily deprived of its contents and the sweeping, if not entirely finished, resumed.

ATTACHING SHOES TO BRAKE BARS.—James Brahn, Jersey City, N. J.—This invention relates to an improved manner of attaching shoes to the brake bars of railroad cars, whereby the shoes may be readily attached and detached, all bolts and screws being avoided, and the shoes, when attached, effectually prevented from being casually detached. The invention also relates to a peculiar application of india rubber to the shoes, whereby a requisite degree of elasticity is allowed the same, in order to prevent wear and tear.

CLOVER SEED HARVESTER.—S. L. Stockstell and W. H. H. Scarff, Medway, Ohio.—This invention relates to a machine for gathering or harvesting the heads of clover, cutting the heads from the standing stalks, and consists of a suitable bed suspended from an axle and provided with a cutting and raking attachment.

ORNAMENTING BOOTS AND SHOES.—George Smith and Godfrey Smith, New York City.—This invention relates to a mode of ornamenting boots and shoes, designed as a substitute for and an improvement upon the ordinary mode of producing ornaments by crimping the leather through the medium of dies.

MACHINE FOR CUTTING VENEERS.—Henry Cassing, New York city.—This invention relates to a machine for cutting veneers, and consists in the employment or use of a reciprocating knife, arranged to work in a plane slightly inclined from a vertical position, in connection with a laterally moving log carriage, all being combined and arranged in such a manner that the knife is made to operate with a drawing cut, and perform its work in a perfect manner, and with but a moderate expenditure of power.

BOOT CRIMPING MACHINE.—E. H. Rice, Port Henry, N. Y.—This invention relates to a machine for crimping boots, and it consists of a series of rotary trees in connection with a plurality of jaws or pressure plates, all constructed and arranged in such a way as to admit of boots being crimped rapidly and in a perfect manner.

MOWING AND REAPING MACHINE.—James H. Redfield and Walter J. Cox, Salem, Ind.—This invention relates to a cutting apparatus, the same consisting of a series of hook-shaped teeth, attached to or formed on a bar, the ends of which are attached to or connected with cranks, or crank pulleys, which operate the teeth or sickle bar so that each tooth of the bar will pass from the center of one guard or finger across the space and into the adjoining guard or finger, and in thus moving act with a drawing cut upon the grain or grass, cutting the same in a perfect manner, and with a very moderate expenditure of power. The invention further relates to a new and improved means for discharging the grain in gavels from the machine, and further, in a peculiar manner of applying the frame which supports the cutting apparatus and grain-discharging device, to the main frame, whereby the cutting apparatus may be adjusted higher or lower, as desired, with the greatest facility.

BED BOTTOM.—John C. Fry, Sidney, Ohio.—This invention relates to a new manner of securing the wire for holding the elastic rings, in the ends of the slats, and in the cross-pieces that are secured to the bedstead. The said wires are secured in such a manner that the ends of the slats are not only not weakened by their application, but are actually strengthened and prevented from splitting.

COSMETIC.—J. M. Wilson, Seguin, Texas.—This invention or discovery relates to a new and useful improvement in the composition of a cosmetic for removing freckles or tan discoloration from the skin and improving the complexion. This improvement consists in combining certain chemical ingredients and making a solution thereof with which the skin shall be wet for the purpose aforesaid without injury to the tissue.

HERNIA TRUSS.—Samuel Green, New York city. This invention relates to an improvement in the construction of a truss for ruptures of the bowels or hernia and consists in a novel and simple combination of springs and pads with the main supporting bars.

GATE HINGE.—Paul Dennis, Schuylerville, N. Y.—This invention consists of an improved gate hinge and has for its object increased strength and durability of the hinge and diminution of the friction in opening and closing the gate.

MACHINE FOR BORING POST HOLES.—A. Q. Allis, Dayton, Ohio.—This invention consists in operating a vertical boring bar by crank and gearing and in an arrangement whereby the auger is fed down into the ground by a screw and raised from the ground by a lever and also in the manner in which the feeding screw nut is made to engage with and is detached from the boring bar and also in a boring tube.

COMBINED PILLOW AND SUPPORTER.—Emeline T. Annis Mt. Morris, N. Y.—This invention consists in forming the pillow on a plate or flat surface of metal or wood or some other suitable material, and attaching thereto a jointed bracket and supporting rod so arranged that the pillow may be adjusted to suit the wants of the invalid or other person occupying it by turning a thumb nut.

TREATING PHOSPHATIC MINERALS OR EARTHS.—John Commins, Charleston, S. C.—This invention relates to an improved mode of treating natural phosphates or phosphatic minerals and earths for the purpose of rendering them soluble to serve as fertilizers.

HORSESHOE.—James Jorey, Westville, Conn.—This invention relates to a horseshoe of that class which are provided with removable or detachable calks. The invention consists in having the calks constructed and applied to the shoe in such a manner that they may be not only detached from the shoe but also reversed and secured thereto in such reversed position as to admit of a fresh cutting or sharp edge for the calks being obtained, the calks being constructed with two edges to obtain this result. If necessary or desired one edge of the calks may be made sharp and the other edge comparatively blunt so that a horse may, by a very simple adjustment of the calks be provided with either sharp or blunt calks, be either sharp or "rough" shod, the latter condition being preferable when the roads are not very slippery or icy and the former condition preferable when there is much ice.

BREAD AND VEGETABLE CUTTER.—Hiram A. Titus, Gloversville, N. Y.—This invention relates to a new bread and vegetable cutter which is so fitted at its two ends in a frame that when it is drawn through the article to be cut a combined drawing and pressing cut will be imparted to it.

MACHINE FOR CLEANING COTTON.—Richard H. Hilton, Newbern, N. C.—This invention consists of a perforated case, into which the cotton is fed from the cotton gin, together with rollers, for the purpose of ejecting the cleaned cotton in the form of a sheet or pressed web more convenient for packing.

MEASURING AND TALLYING ATTACHMENT FOR THRESHING MACHINES.—W. F. Abbott, Marengo, Ill.—This invention relates to a machine for measuring grain, and tallying the number of measures of the same, which pass through it, and consists of an elevating spout measuring chambers and automatic tallying register, and other mechanism perfecting the whole.

CLEAT.—Jonathan Bangs, South Dennis, Mass.—This invention consists of a lever, having on its upper side a hook into which the line or rope is passed, and is thus passed under the handle so that any draft upon the hook will press down the handle, and thereby bind upon the line.

CATTLE PRICKER.—R. A. Carson and W. T. Peter, Brinsburg, Ky.—This invention relates to a new method of constructing apparatus whereby cattle are prevented from lying down away from from home at night, and whereby also they are prevented from jumping fences, and are made more manageable when they are driven by droves. It consists of a leather strap fastened around the foreleg of the animal, above the knee, said strap having sharp pieces of metal secured to the same, and bent downward, so as to prick the animal when it attempts to lie down or jump.

GRAIN REGULATOR FOR GRIST MILLS.—E. W. Hitchings, Potsdam, N. Y.—This invention refers to an attachment to grist mill stones, for the purpose of regulating the supply of grain passing into the stone. It consists of a cylinder carrying a governor which regulates the opening through which the grain falls according as the stone is driven fast or slow, together with other devices perfecting the whole.

WAGON LOCK.—C. A. Kenyon, McGregor, Iowa.—This invention relates to a new and improved method of constructing wagon locks, by means of which the brake is more firmly held against the wheel, and whereby also the pressure of the same is more quickly and easily taken off. It consists of a pawl, pivoted in a slot in the lever by means of which the brake is operated, engaging in the teeth of a metallic segment, so as to hold the brake firmly against the wheel, after the hand of the operator has been removed. It consists also of the lever being bent at the lever end, and provided therein with a slot in which the pivot on which said lever turns may move, so that by the reverse motion of the lever the slot in the bent end of the lever will slide over the pivot, and the pressure of the brake upon the wheel will be relieved.

SAND HEADS FOR AXLES.—Norman Maxham, Hancock, Vt.—This invention relates to a new and improved method of constructing apparatus for preventing sand or dust from working into and injuring the boxes or axles of carriages. It consists of a sand head attached to the hub, revolving with said hub around the axle within a cover or box attached to the axle, said cover being provided on the under side of the same with a nick or notch through which sand or dirt caught will fall to the ground.

DRILL AND COUNTERSINK.—P. A. Whitney, Woodstock, Vt.—This invention relates to a new and improved method of constructing drills and countersinks, whereby they are combined in the same tool, are more simple in their construction, and more certain in their operation. It consists in the countersink being in two parts, with the drill between the same, keyed in such way in splines in the chuck as that the same are adjustable, the chuck being screwed into the lathe socket so that the two segments of the same are forced firmly together, thereby holding the drill and countersink firmly in the chuck. It consists also in one of the splines in the same segment of the chuck being deeper than the other, and deeper, also that the opposite spline in the outer segment of the chuck, whereby the cutting edge of counter sink is brought into proper position for cutting a countersink.

CURLING IRON.—Samuel E. Condon.—Brooklyn, E. D., N. Y.—The present invention relates to irons used for curling in the dressing of a person's hair, and consists in providing for the iron a casing or sleeve of suitable construction to incase and hold the same, whereby the iron, being first heated by inserting it in a suitable furnace therefor, or otherwise, and then placed in such case, the necessary heat is imparted thereto for curling the hair, when applied to the same, the combination of the case with the iron always preserving a smooth and even surface for being presented to the hair, however much the iron itself may become "scaled" from the action of the fire thereon.

BUCKLE OR FASTENER FOR STRAPS, ETC.—S. W. Durham, Ipava, Ill.—This invention relates to an improved fastener or buckle for securing and fastening the end of a strap when turned over at its end upon itself for forming a loop.

LITHOGRAPHIC AND AUTOGRAPHIC PRESS.—Chas. C. Maurice, New York city.—This invention relates to a lithographic, or other printing press, in which the stone or block is held in an adjustable frame, which can be expanded or contracted, so as to be adjusted to stones of different widths.

CONCRETE BRICK MACHINE.—Isaac Pardee, Vineland, N. J.—This invention relates to a new machine for pressing and forming concrete stones for building purposes, in a separate press, which is so constructed that it can be easily handled, and that the ready pressed concrete can be easily removed from it.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

203.—SEWING MACHINE.—Singer Manufacturing Company, New York city. Jan. 20, 1868.

214.—APPARATUS FOR INDICATING THE RELATIVE POSITIONS AND MOVEMENTS OF CERTAIN HEAVENLY BODIES.—John Davis, Allegheny City, Pa. Jan. 21, 1868.

207.—SECURING CORKS IN BOTTLES.—Richard Scrivener, New York city. Jan. 21, 1868.

215.—FURNACE.—Henderson Ross, Pittsburg, Pa. Jan. 21, 1868.

219.—LIBERATING THE COLORING MATTER OF MADDER, ETC., FROM THE LIGNEOUS MATTER OR CELLULOSE.—Alfred Paraf, Boston, Mass. Jan. 21, 1868.

208.—PULL FOR DOOR BELLS.—Sterling Bonsall and Louis Hillebrand, Philadelphia, Pa. Jan. 25, 1868.

273.—HATS, BONNETS, ETC., AND MACHINERY FOR MANUFACTURING THE SAME.—Henry Kellogg, New Haven, Conn. Jan. 27, 1868.

280.—MACHINERY FOR GRINDING AND POLISHING CONCAVE SURFACES.—Wm. C. Hicks, New York city. Jan. 27, 1868.

281.—MACHINERY FOR FORMING HAT BODIES, SKIRTS, ETC.—John H. Prentice, Brooklyn, N. Y. Jan. 27, 1868.

209.—BELLOWS FOR FORGES.—John and Walter Bowden, Brooklyn, N. Y. Jan. 28, 1868.

317.—BREECH-LOADING FIRE-ARMS, AND CARTRIDGES AND BULLETS FOR THE SAME.—Hiram Berdan, New York city. Jan. 29, 1868.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however when paid for as advertisements at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

T. H., of Wis.—"In dispute A makes the following proposition: Of two equal bodies, impelled by equal forces against equal resistance the time of their arrival at their respective destinations must be in the proportion of those distances, or: Equal bodies impelled by equal forces against equal resistances will describe equal space in equal time. To this B dissents and asks for proof. A says the proposition is self-evident. What is your opinion?" We regard the proposition as self-evident and cannot conceive the ground of B's denial.

C. M. T., of Ind.—"How can I make a lithograph transparent? I have tried balsam of fir and dammar varnish but specks appear after drying." We think Canadian balsam, if pure and carefully laid on, would be effectual.

J. R. W., of N. C.—"What per cent of water is expended to elevate a given quantity of water to a certain hight by the hydraulic ram?" A good ram will yield effectively 60 per cent.

L. M., Jr., of Pa., is anxious to build a "paper boat" and wants to ascertain the sort of paper and *modus operandi*. Such boats have been built which were light, safe, and durable. A patent on making boats of paper is owned in part by Elisha Waters, Troy, N. Y. Write to him for information.

O. S., of Ohio.—"Is there anything gained by applying steam to the surface of a wheel, if confined as closely as in a steam engine cylinder creating no more friction? I have a simple device by which I can do this successfully." Yes. If you can make a rotary engine that has no more friction than a reciprocating one you have an invention we would like to see.

H. P. D., of Texas, says that kerosene oil on whet-stones is superior to any other for the purpose, as it keeps the stone in better condition and assists the operation of sharpening.

J. C. B., of Ill.—Tubing for an artesian well of 200 feet depth may be made of two-inch gas pipe, connected by thumbles and screw threads in the usual way. Piping or casing of cast iron four inches diameter should be sunk to the first stratum of rock.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Two Valuable Patents for sale—one for a Fertilizer, and the other for Harness Wardrobe. Address H. E. Pond, Franklin, Mass.

Bartlett's Reversible Sewing Machines are the cheapest reliable Machines. Bartlett Machine and Needle Depot 369 Broadway, N. Y.

Merriman's Patent Bolt Cutters—Best in Use. Address, for circulars, etc., H. B. Brown and Co., New Haven, Conn.

For all sizes of Tube for Steam, Gas, or Water, and the most improved Tools for Cutting off and screwing the same, address Camden Tool and Tube Works Co., Camden, N. J.

Incrustations removed by Winans' Boiler Powder (11 Wall st., N. Y.), 12 years' use proves it reliable and uninjurious.

Inventors and Patentees wishing to get small, light articles manufactured for them in German Silver or Brass, address Schofield Brothers, Plainville, Mass.

Manufacturers of Ditching Machines of from three to four feet wide by same depth, address M. White, Jr., New Orleans.

Charles Ball, Bridgeport, Conn., makes Odometers.

Hardware men, agents, and others, address Robert Faries, Decatur, Ill., concerning his attachment to the monkey wrench for pipes.

A Rare Chance for Agents. Large profits and little capital needed. For sample and circular, inclose 25 cts. to Smith, Shepard & Co., P. O. Box 867, Waterbury, Conn.

Wanted—Address of Gas Holder, Purifier, and Condenser Makers. Apply to Edward T. Moody, C.E., Omaha, Neb.

For Improved Lathe Dogs and Machinists' Clamps, address, for Circular, C. W. Le Count, South Norwalk, Conn.

Address J. S. Elliott, East Boston, Mass., for best machinery for making lime and sand building blocks.

M. K. Anderson's patent self-acting alcoholic blow pipe wanted. They were made at Painted Post, N. Y. Address, stating price, or bring two to E. S. Taylor, No. 11 Adams st., Brooklyn, N. Y.

Parties in want of the best Pin Machines are informed that we are now prepared to receive orders for them. We have also on hand one machine for No. 4 pin, for sale low. Hoxie & Tolles, Hartford, Conn.

Patentees desiring to give exclusive right to dispose of Territory or their articles to a reliable firm who have the facilities for, and will advertise them, in every county in the United States, at their own expense, should address Oliver Crook & Co., Dayton, Ohio, and inclose a circular describing their patent.

Manufacturers of Agricultural Implements send circular to A. H. Briggs, Milton, Ky.

Manufacturers of Light Metallic Tubing please correspond with J. S. Lawson, Disco, Mich.

Manufacturers of Ditching Machines address, with description, D. A. Griffiths, St. Charles, Mo.

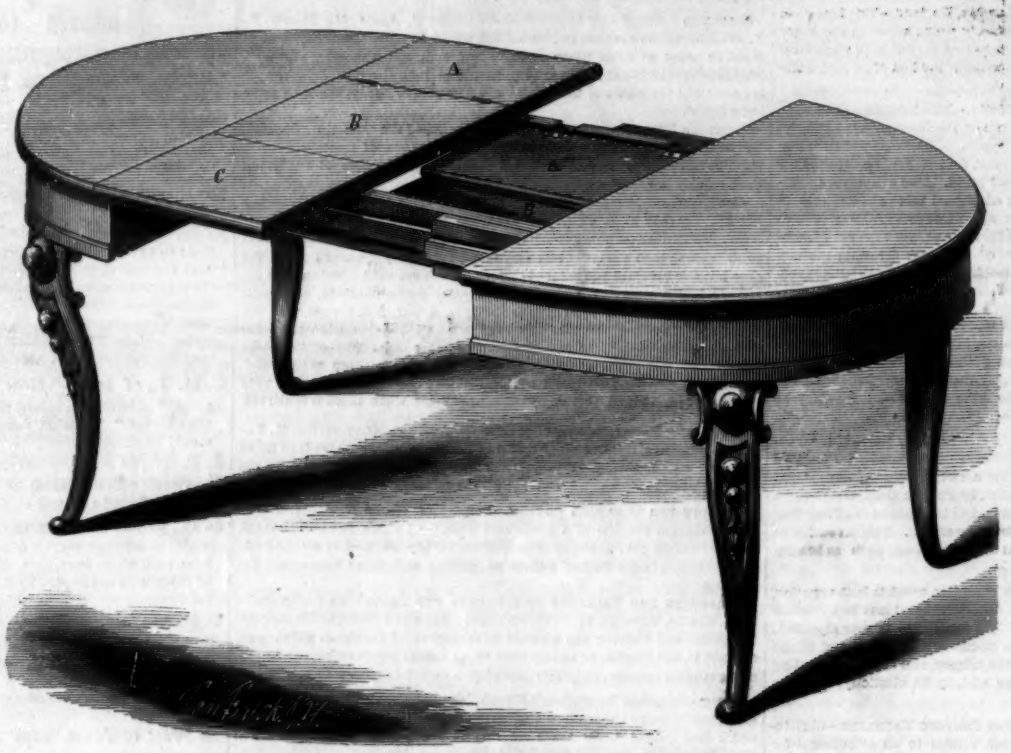
Buckelew & Waterman, 716 Market st., Philadelphia (city Sealer's office). Manufacturers and Dealers in weighing scales, weights and measures, will take the agency for some saleable articles.

A Practical Man wanted to make Wood Acid in crude. Also, Book Sellers, having books treating upon the subject, please send their address to Henry Winter, Honesdale, Pa.

Make your Patents Pay!—J. H. White, Newark, N. J., will make and introduce all kinds of Small Wares in Brass, Tin, and Iron.

Improvement in Extension Tables.

The dining table now in almost universal use, which may be made to accommodate from four to twelve or more persons, is a great improvement on the old fashioned table, the surface of which could be enlarged only by raising and securing in place hinged outside leaves. But to the modern extension table there are some objections, the lifting and finding a place to deposit the extra leaves when not required for use being quite a serious one. To obviate this difficulty is the principal object of the improved table seen in the engraving. As will be seen, the supplemental leaves are in three sections, hinged together in such a manner that they may be folded one upon the other and shut closely within the body of the table frame. One set is seen open in the engraving, and one set closed. A is the narrow section, being one of the outside leaves; B is the middle and widest section, and C one of the side leaves, folding, when closed, under the middle leaf, B. If greater support to the outer leaves than is afforded by their connection with each other and contact with the frame, is desired, a light bar is adapted to slip into suitable recesses on the outside rim of the table directly under the leaf.

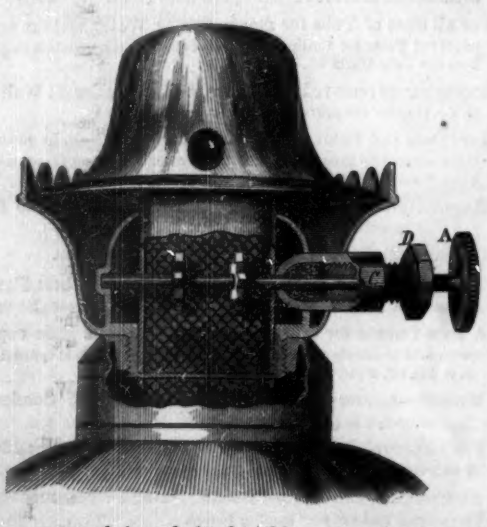


J. B. CURTIS' INCLOSED LEAVES EXTENSION TABLE.

It will be seen that there is no annoyance or labor of lifting out and putting in heavy sections of table top, nor is there so much danger of the leaves splitting and warping as when they are large and movable. The table is essentially a unit, and even when closed to its smallest dimensions can be readily moved about, or used for a center table, and still contains within itself all the elements of an ordinary extension table. It is an invention, we predict, that will come into extensive use. It was patented through the Scientific American Patent Agency, Nov. 6, 1866, by J. B. Curtis, whom address for further information, at Port Henry, N. Y.

GROSVENOR'S IMPROVED NON-EXPLOSIVE LAMP.

The cause of explosions of kerosene and other hydro-carbon lamps is generally believed to be the ignition of hydrogen gas contained in the reservoir between the surface of the liquid and the top inner surface of the lamp. Atmospheric



air or oxygen, being admitted to this space, makes, in combination with the hydrogen, a highly inflammable gas, needing only ignition or a certain degree of temperature to cause an explosion. Now if this gas can be displaced by one which is anti-phlogistic it is evident all danger from this source will be avoided. This, the inventor believes, he has accomplished in this simple improvement.

The engraving shows the details of this device as applied to an ordinary kerosene oil lamp. It is intended to entirely exclude atmospheric air from the interior of the lamp, no orifice but the wick tube—which should be filled by a closely fitting wick—leading from the external atmosphere to the interior of the lamp. All the joints of the burner are made air tight by soldering or brazing. The end of the elevating shaft opposite the thumb piece, A, which ordinarily passes through the side of the burner, is supported in a close socket, B, inside the shell, and the other end passes through a stuffing box, C, containing suitable packing which is set around the shaft by the hollow screw, D.

The inventor says, in brief, that "with this burner, as the vacuum made in the oil reservoir by the consumption of oil cannot be supplied with atmospheric air, it must, necessarily be supplied with nitrogen gas—or any uninflammable gas generated by combustion, as carbonic acid. As oxygen and nitrogen are separated by combustion, and the oxygen is consumed in the process, the liberated nitrogen necessarily descends by atmospheric pressure through the interstices of the wick, in sufficient quantity to supply the gradually extending vacuum, even to the entire exhaustion of the oil, when the reservoir will be filled with this anti-phlogistic gas, in which even a lighted match will not burn for an instant. As there is no orifice for ventilation, evaporation from within is precluded except through the tube to the flame, where it can be profitably used; consequently no oil can gather on the outside of the lamp to soil fingers or clothing or to invite external ignition and consequent internal explosion."

Patented Dec. 10, 1867, by Cyrus P. Grosvenor, who may be addressed at McGrawville, N. Y.

Treating Wood for Covering Walls, etc.

Patented by Abbot R. Davis, of Cambridge, Mass. My invention consists in the employment of glycerin for saturating the thin sheets or laminæ of wood to be used as a wall covering, or for other purposes, whereby the sheets are rendered soft and plastic, and thus prevented from cracking and breaking when exposed to a dry atmosphere before or after being applied to the wall or other surface.

Glycerin and water, in about the proportion of one part of the former to two or three of the latter, are mixed together, the two ingredients readily uniting. The thin sheets of wood above referred to are now saturated with this mixture, and then placed where the water may evaporate therefrom, the glycerin still being retained by the wood and being absorbed by it so as to cause it to remain permanently soft and pliable. The amount of glycerin to be mixed in water may be increased according to the nature and degree of hardness of the wood to be saturated, but I have found the mixture produced by the ingredients in about the proportions first named to answer a good purpose, and glycerin alone may be used without departing from the spirit of my invention. I am aware that glycerin has been employed for saturating sponge to render it elastic for use as a substitute for hair and other material for filling mattresses. The application of glycerin for this purpose I do not, however, claim, but confine myself to the following, viz: the employment of glycerin for saturating thin sheets or laminæ of wood to be used as a wall covering or for other purposes, substantially as described.

Illuminating Gas Mixture.

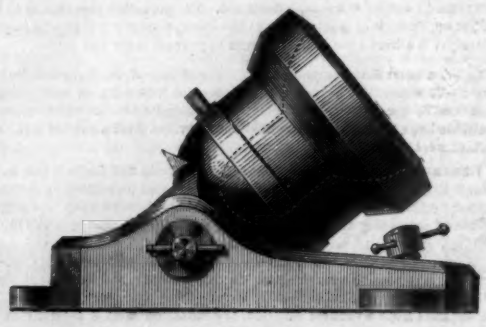
John J. Ensley, of New York city, has patented the following: I make common coal gas in the usual way, and by ordinary means. I also make separately a gas from any convenient vegetable substance or substances, such as wood, shavings, sawdust, etc., and mix the gas with the coal gas in any convenient proportions, according to convenience, or the relative abundance or cheapness of the two gases; or, I make a gas from any animal substance or substances, such as bones, offal, etc., and mix with the coal gas in convenient proportions say, of one part of the gas from animal substance to three parts of coal gas, or otherwise; or, I mix the gases, made both from vegetable and animal substances with the coal gas, in convenient proportions, no exact proportion of either being essential.

The object of this mixture of gases is threefold: first, by the mixture of different gases in this way, especially by the admixture of gas from animal substances with coal gas, I am more sure to produce good illuminating gas, by furnishing proper proportions of carbon and hydrogen; second, in the separate manufacture of gases made from vegetable and animal substances, I produce and utilize other products of the distillation, such as charcoal and bone black; and third, in many instances, by having an abundance of vegetable or animal substances, or both, at hand, and not otherwise of value, I can make use of them and thereby cheapen the manufacture of gas for illumination.

Mountain Mortars.

After all has been done to reduce the weight of mountain mortars to a minimum, it remains a fact that they are not portable in the highest degree, and it is not to be denied that in the endeavor to secure such portability as they possess much of their efficiency has been sacrificed. We believe that as a consequence of the existing prejudice against mortars a very valuable weapon has not been supplied to our Abyssinian troops, and, as none of the essentially military papers have called attention to the subject, we do so. About twenty-four years ago we carried on a war against certain of the aboriginal New Zealand tribes and a very troublesome, and, in its way, expensive little war it proved to be. At that time we had no rifled mountain guns, but we had little howitzers, intended to answer much the same purpose, and probably not much less efficient. These howitzers, however, proved to be next to useless. The natives entrenched themselves within pahs, from whence they could not be dislodged, and into which our troops could not get without great loss of life. The pah consisted of spaces inclosed by walls made of piles driven in two rows about four feet asunder, the space between being filled with clay after the manner of a coffer dam. The little howitzers in some cases could not be brought up to act against these pahs at all, and in others they could not breach the walls. "Toney Heckey," a native chief, constructed one of these pahs on the top of a hill, from which he could not be dislodged. In this emergency, Capt. G. R. Mann, R.E., proceeded to Sydney, and from his designs twelve little mortars, as illustrated in the accompanying engraving, were made by Mr. Russell, of Sydney.

Our engraving, for which, with this description, we are indebted to *The Engineer*, prepared from the original tracing made twenty-four years ago, illustrates their construction so clearly that no special description is necessary. The cast-iron base weighed but twenty-eight pounds, and was fixed to a piece of two-inch plank 24 by 16. The mortar, of gun metal, weighed only 65 pounds, and was, of course, still more portable. The charge consisted of 8 ounces of powder and a common 5-inch shell. It may be thought that as there was no length of chase, only half the shell being contained in the mortar, the range would have been very small. In point of fact, however, the range was 550 yards, quite sufficient for the required purpose. These little mortars were carried up



by a few men within a few hundred feet of the pah to be attacked, and pitched their shells with ease into the very heart of the camp. They proved perfectly effectual, and infinitely more useful than the small guns, not only in attacking pahs, but in dislodging the enemy from jungle, as they could be put down at a moment's notice, and used while troops were on the march. They certainly exceed in power any other weapon of equal weight, for a 5-inch shell, weighing some 12 or 14 pounds, and containing a heavy bursting charge, is no contemptible foe. The remarkable range of these little mortars is an excellent illustration of Lynall Thomas' theory of the percussive action of exploding gunpowder, and it is possible that with gun cotton the range would be still greater. Judging by the good service they have done, we cannot resist the conclusion that a few such mortars would prove a useful addition to our Abyssinian armaments.—*Mechanics' Magazine*

CHASSEPOT WOUNDS.—It appears from the testimony of surgeons who participated in the last Garibaldian campaign, that while a large number of troops are put *hors de combat* from the multitude of missiles which this fire-arm can scatter over the battle-field, yet by reason of the small size of the projectile, the number of fatal injuries is very small in proportion to the total number of wounded. It has also been ascertained that the Chassepot bullet rarely shatters a bone, but in the large majority of cases passes around it.

Scientific American.

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NEW YORK, SATURDAY, MARCH 14, 1868.

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MECHANICS AND THEIR TOOLS.

It is useless to expect first-class work from even good mechanics using strange tools. The hand and the handle, the workman and his tools, should be well acquainted; if such a sentiment could be predicated of inorganic matter, they should be in sympathy. It has been said that "any fool can work with good tools, but it takes a workman to use poor tools." It is much nearer the truth to say that "few can work well with strange tools." Some branches of mechanical business offer advantages in this respect over others. The carpenter or the joiner, for instance, owns his own tools, selected with great care, or made by himself to suit his hand and his peculiarities of workmanship. But the machinist, unless a very ambitious workman and one who has possessed unusual opportunities for working for himself, seldom carries with him anything more than a pair of small callipers and a steel gage. When he goes into a shop, if he works at the bench the vise is strange, the hammers are not handled and balanced to his mind, the cold chisels are "stunt" and misshapen, and the file handles unhandy. If he works on the lathe or planer, he finds the cutting tools entirely different in their forged form and ground edge from those to which he has been accustomed; and until he "gets the hang of the new school-house" his productive work amounts to very little. So well is this understood that the new comer in the shop is generally allowed a day or two with *carte blanche* on the forger to put his tools in shape. This should always be the case, and the machinist ought to be encouraged to occupy his time "between jobs" with the work of finishing his hammers, center punches, scratch awls, etc., until he gets a set fitted to his hand and consonant with his taste. Time so spent and material so used would not be wasted, as the workman, if he is worth anything, would, by his more cheerful and ready interest in his work, soon make up for the time thus spent, while if he did not purchase the tools at the expiration of his term of employment, they would add to the stock on hand, which is always available.

All this can be done under a judicious manager without encouraging finicalness or fanciful notions in the workman, while it would offer encouragement and assist endeavor. The habituation of the workman to his tools has been and still is too much overlooked by employers. If every workman was a machine, merely, what would suit one would fit another; but the human organism is affected and sometimes controlled by circumstances in themselves trivial; every workman should have his own tools, or he should be privileged to select his own style of tools to suit his handiwork. In the end it will be found to be better for both the workman and for the employer.

PRETENSIONS OF MECHANICS.

Assumptions of superior knowledge and pretensions of superior position and acquirements are, under any circumstances, obnoxious. Especially are they so when made in relation to mechanical processes. The workman who descends to this mean trickery of pretension to sustain himself at a fancied elevation above his fellows is either a charlatan, pretender, or miser. If a mechanic has made a discovery of any real value, whether relating to the construction of a machine or to an improved process of manufacture, our patent laws, liberal and just, will protect him in the proprietorship of his improvement; but the attempt to impose upon his fellows by the pretense of a knowledge above theirs, is neither manly nor honorable. Really, there is no reason for keeping a secret in the mechanical arts, and it is as impossible as unreasonable, especially if the improvement is valuable, and if not so, there is no reason for attempting to keep it private. We are aware that some large concerns make it a point to keep some of their processes secret; but out of a number we know, who have preferred this course to a publication by means of letters patent, no one of them has been able to preserve the secret inviolate. Locked doors and "iron-clad" oaths exacted from employés, avail nothing against the insatiable curiosity of men, or the cupidity or interest of employés. In fact, in many cases the product of manufacture, when analyzed by an expert, exhibits the method of production as exactly and satisfactorily as though the process itself had been exhibited.

As the working of steel involves many problems seemingly contradictory, not a few of which are still unsolved, its manipulation is made the occasion for much of this charlatanism. Pretended sleight of hand in heating and hammering, mysteriously compounded baths for hardening, etc., are used to befog the uninitiated and astonish the ignorant. Such nonsense is paltry, and wholly unworthy the dignity of the mechanic. It is highly proper that the mechanic should feel a pride in his superior skill and his superior knowledge, for these have been attained with labor, time, and patience, and are really valuable, but to make pretension where no ground for it exists is childish and foolish.

But if these pretensions are unworthy when made by experienced mechanics, they are simply contemptible in an ignorant charlatan who attempts to impose by loud talk and "blowing." Hardly a concern of any extent but has one or more of these "blowers" about the works. They pretend to know everything, while they really know very little. Such a one we once saw, who attempted to teach a machinist how to use prussiate of potash in case hardening, condemning the plan of one single heating, and insisting on re-heating the article after the flux had melted. When he failed to produce the hardness sought, he condemned the chemical, instead of acknowledging his ignorance of the process.

Running over in our mind the list of the best practical mechanics with whom we have had the honor to be associated and acquainted, we find that almost all of them were reticent of speech, careful of giving counsel or of obtruding their notions, obedient to the directions of those set over them, and otherwise unassuming in manner; while at the same time they were capable of doing, directing, and managing when their duty called. True merit is generally modest. Pretension may for a time impose upon credulity and good nature, but the shop is a great leveler, and the pretender will sooner or later disclose his true character by his assinine bray, in spite of his lion skin disguise.

LAMPBLACK—ITS MANUFACTURE.

A correspondent from North Carolina asks for information in regard to the manufacture of lampblack. He is engaged in distilling turpentine and making resins, and has large quantities of dross, etc., left, which he supposes may be made available in the production of lampblack.

Its manufacture is very simple and the apparatus cheaply built. The refuse tar, resin, etc., is put in iron pots or in a furnace and burned with the least possible admission of air—just sufficient to keep up a low combustion—in order to produce a dense smoke without much flame. The smoke is led into cylindrical upright chambers lined with sheepskin, woolen cloth, or canvas. The roof is conical in form, made of sheet iron, hanging within the cylinder, the circumference fitting the sides of the cylinder. This roof is suspended by pulley and chain, and is occasionally lowered to the bottom, in its progress scraping the accumulated lampblack from the sides and depositing it on the bottom, from which it is removed by means of a hoe or scraper through a small door. A series of these cylinders may be used, communicating with each other by horizontal passages, the roof of the last one being partially open at the apex, to allow for a draft. The lampblack deposited in the last of the series is the finest; but the best of it contains more or less resinous and oleaginous matter, which must be eliminated to purify the product. This is done by heating the lampblack in cast iron boxes with a close cover, raising and keeping the lampblack at a red heat for two or three hours.

Ivory black, used largely by artists as a pigment, and bone black, employed in the purification of sugars, are the product of the destructive distillation of animal bones. Spanish black is the carbon of cork, and has a brownish tinge. Peach black, resulting from the combustion of peach kernels, has a bluish tint. All these forms of carbons are used as pigments.

SIZE OF WHEELS FOR VEHICLES.

A correspondent from a portion of Hartford county, Conn., which is blessed with many hills, says he is in much need of a solution of the question as to the proper size of wheels for teams. He says, "With a team (two horses probably) I can draw a tun of 2,000 lbs., using wheels five feet diameter; how much more can I draw on wheels of seven feet diameter, and how about drawing on a level or on ascent?" He further says: "It has for a long time seemed to me that the principles involved in the above were very important to a large class. I propose to construct wheels of seven feet diameter on trial, as the roads over which I do my teaming are quite hilly."

We are not aware that any rules, practically effective, have ever been published as to the best diameter of carriage wheels. A great change has taken place within fifteen years in this respect, so far, at least, as relates to pleasure carriages. The small forward wheels, with low axles and high bolsters, which were the style ten, fifteen, or twenty years ago, have given place to those which are as large, or nearly so, as the hind wheels, the difference on the draft being made up by the downward rear curvature of the shafts. They run much easier than carriages with diminutive forward wheels. For level traveling it would seem that pretty large wheels, suited to the draft animals, would be preferable to small wheels; but on an upward grade they have their objections.

COMMUNISM IN THE SHOP.

Interchange of tools and other appliances in the shop may be made either very pleasant, or a source of great annoyance. The "stealing" of tools is often practiced, but only by those who not only forget their duties as mechanics, but their honor as men. No right-minded mechanic will refuse assistance to his fellow workman, either in advice or in the loan of tools, but it is the hight of impudence to reject the advice without giving a reason, or to return borrowed tools in a condition unfitted for service.

There must be more or less of the apostolic idea of communism in the shop: "all things must be in common" to a certain extent; but it is an evidence of a mean nature when the workman is willing to use the tools of his fellow and return them in a shape unfit for further service until repaired.

The habit of leaving a borrowed tool, when done with, where last used is almost criminal. This negligence—to call it by no harsher name—is very common, but it is dishonest as well as careless. Many valuable tools are thus injured, and sometimes lost. The workman who is so neglectful and careless can hardly be deemed honest. There is, or should be, a sentiment of honor in this repect among workmen, and we are certain that a simple allusion to the matter will induce our careless mechanics to "reform their ways."

UTILIZATION OF TINNER'S WASTE.

In the scraps of the tinshops, thrown away often to hundreds of tuns by the tinners of one single city, we possess two valuable metals, iron and tin. Attempts have been lately made for separating these metals by melting, but the process has been as yet without success. What physical action, however, could not do, chemical affinity, will surely complete. We say this in regard to a process by which the sheet tin may be freed from its coating without being subjected to heat. The process is by first treating the scraps with a solution of caustic lye, thereby obtaining as a product a valuable color base (stannate of soda, resp. potassa), which of late has come into extensive use among dyers. As both the iron scraps and the tin solution serve useful purposes in the arts, we trust that many of our readers will be interested and instructed if we devote some space to the above subject.

PREPARATION OF STANNATE OF SODA.—For fastening and brightening dyes, especially Turkey red from madder, stannate of soda is unsurpassed by any mordant; it is furthermore not poisonous, as is the double salt of arseniate and stannate of soda, a base hitherto employed to some extent for fixing fabrics. For its preparation the tin scraps are rolled up spirally and put in a wooden tub with 10 per cent of sulphur and 5 per cent of solid caustic soda (in manufacturing the resp. potassa salt, take 7 lbs. of the latter), enough water being added to cover them. Then steam is turned on and the same allowed to pass into the liquid, until the scraps are free of tin, when the alkaline liquor is drawn off by a faucet and left to evaporate in an iron kettle until crystallization takes place. From the crystals which simply constitute glauber salt, the mother lye is separated, evaporated to dryness in another vessel, leached out by water and filtered. The product thus obtained is left to crystallize, thus forming the stannate of soda; 100 lbs. of scraps yield 12 to 15 lbs. of the latter.

PREPARATION OF A NEW (TIN) GREEN.—This paint—which we propose to call "Phenician green," because its base, the tin, was first obtained by the ancient Phenicians—is not poisonous like Paris and other greens; it does not bleach; may be used as lime and water color and it deepens in oil. We prepare it by adding a solution of stannate of soda, made of 15 parts of the dry substance to one consisting of 12 parts of blue copperas. The precipitate obtained is collected and washed out; by adding chrome yellow or a decoction of fustic a blue shade may be imparted to it.

PREPARATION OF MOSAIC GOLD.—Bisulphuret of tin forms gold colored, translucent scales, of a peculiar soapy feeling. It is largely employed in bronzing wood. The following is a description of its mode of preparation from tin scraps: Put the scraps in glazed pots, cover them with muriatic acid, and when the tin is all taken up, transfer the liquid into another vessel. Should it yet contain free acid, add new scraps. Then immerse copper plates into the liquid; the tin will thus by galvanic action precipitate upon them as a spongy mass. Collect the tin, wash it with water, dry it and mix it intimately with equal parts of sulphur and salammoniac, fill the mixture into glass retorts and heat them up gradually on a sand blast. The bronze is obtained partly as a sublimate, partly at the bottom of the retort.

FOR THE MANUFACTURE OF COPPERAS.—This process is too well known to be described.

PREPARATION OF A NEW POLISHING FOR OPTICAL GLASSES.—The same is obtained by precipitating a copperas solution by oxalic acid, and drying and heating the precipitate.

PREPARATION OF "IRON GREEN."—First prepare Prussian blue by mixing a solution of copperas with one of yellow prussiate of potassa, solve the same in oxalic acid, and add to the resulting blue liquid a solution of bichromate of potassa and a small quantity of lead sugar. Collect the green precipitate, wash it out, and dry it. You may obtain any intermediate shade, from the deepest blue to the brightest green, in varying the proportions of the three solutions. In closing, we will mention that zinc and cadmium are thrown down in a dentistri from a solution of binoxide of tin in potassa.

A New Vessel of War.

Mr. John Elder, of the celebrated shipbuilders' firm, Randolph, Elder & Co., in Glasgow, has recently patented a most original form of iron-clad ram for coast defenses and attacks on sea fortifications. Mr. Elder's vessel is formed below the water line as a segment of an enormouns sphere, say 25 feet deep and 200 feet in diameter, of the circular water-line. This corresponds to a small piece of a sphere, of which the versine over a chord of 200 feet is 25 feet long. Over the water line the armor-clad sides are a short truncated cone, and in the center of this circular deck a high castle or tower, carrying three or four tiers of guns, is arranged. This vessel, being perfectly circular in plan, has neither bow nor stern, nor any of the other steering attributes of ships now in existence; it bears, in fact, the same relation of outline and form to the ordinary ships as the form of a crab bears to that of a fish. The power of locomotion is given to this craft by the reaction propeller. The reaction wheel—probably Mr. Randolph's improved water-jet propeller—is placed in the center of the vessel, at the lowest point of the spherical segment, and the ejection of water can be effected through four openings placed at four equi-distant points in the circumference, so as to command the direction of propulsion without any steering arrangement, by forcing the water through one or two of the passages which command any one of the four quadrants inclosed by them. There are, however, steering or deflection boards fitted to the end of the passages through which the water is ejected; and, by using these boards, a rotary motion can be given to the "crab." By ejecting the water from two opposite passages, or from all four passages simultaneously, and placing the steering boards into a corresponding position, the total engine power of the vessel can be made available for setting the ship into a revolving movement round its own vertical axis. The velocity which the ship is capable of attaining under these conditions, measured at the outer circumference, is very great, since there is no other resistance to this motion except the skin-friction. Mr. Elder proposes to make use of the great momentum which this high velocity of movement will afford for ramming purposes. The whole circular edge of his vessel which is of a sharp angle in section, represents, so to say, the edge of a circular saw or revolving disk wheel, and the accumulated momentum of the rotary movement can be used for producing a destructive effect upon the sides of any vessel with which this revolving turret ship would come into contact. The circular form allows of a very large stowage room as compared with the ordinary form of ships, and it produces a base of such stability as to allow the erection of a tower of great hight in the center, so as to obtain better facilities for attacking objects on shore. Mr. Elder has carried out some experiments as to the resistance to propulsion in a straight line offered by his form of vessel compared with the ordinary forms. He made two models representing equal tunnage, one of the *Black Prince* shape and the other of his spherical form, and the resistance of these two models was measured by an apparatus which afforded a simple mode of comparing the relative proportions of these resistances. The result was only about 10 per cent in favor of the *Black Prince* model, and this seems to indicate that the new vessel would be capable of attaining a fair speed under steam. The advantages offered by this form are of different kinds, the most prominent being a maximum of internal accommodation or stowage room, with a minimum of exposed surface, a circular or turret-shaped armored side, and an extraordinary facility of manœuvring in an action; last, but not least, the total absence of any exposed points of weakness, or "Achilles' heels," such as most iron-clads at present possess.—*Engineering.*

Treating Caoutchouc and other Gums.

J. B. Newbrough and E. Fagan, of New York city, have patented an improved material produced by treating caoutchouc and other gums as follows:

Sulphur is treated by boiling it in turpentine or equivalent oil, a portion of which will be decomposed, and will settle, with the sulphur, to the bottom of the vessel in which the materials are treated. The oil is then poured off, and the solid matter which remains is washed with dilute sulphuric acid, and is dried at a low heat. Iodine is treated in the same manner as the sulphur with oil to which sulphuric acid has been added, to prevent the formation of an explosive composition. Equal proportions of the prepared sulphur and iodine are melted together, and the composition, after cooling and hardening, is thoroughly incorporated with caoutchouc or equivalent gum in the proportion of about three ounces of the composition to one pound of the gum. The gum thus prepared may be molded or otherwise formed of any desired shape, after which it is introduced into an oven the temperature of which, during the first fifteen minutes, is raised to 320 deg. Fah. This temperature is maintained for five minutes, and is then quickly lowered to 250 deg., at which it remains for about an hour, or until the composition is hard. Any color imparted to this composition by the mixture with the same of suitable earthy or mineral matter will not be changed by the hardening process, so that no difficulty is experienced in obtaining a product of almost any desired color; and as but a comparatively low heat is required to harden the composition, the gum is not weakened or injured by the operation in any degree. The product thus obtained is hard, tough and durable, is not affected by nitro-sulphuric or other acid, and is applicable to many useful and ornamental purposes.

The same parties have also patented an improvement in manufacture of articles of rubber, gutta-percha, etc., as follows:

Gutta-percha, rubber, or other similar gum, after being molded, carved, or otherwise reduced to any desired shape, is immersed in bromine and is maintained in the same for such a length of time that, after the article is withdrawn and exposed to the air, the gum will become hardened and otherwise changed in its character so that it can be applied to purposes for which the gum, in its natural state, could not be used. In order to prevent the gum from hardening to any extent before it is withdrawn from the bromine, chloroform, or equivalent solvent of the gum, may be added to the bromine, in the proportion of nine parts of the latter to one of chloroform, and the article of gum is either immersed in the composition, or a portion of gum is dissolved in the same, and the solution is applied, in successive layers or coatings, to a mold on which an article is to be formed, or as a coating to articles of other materials which require to be covered, the gum hardening on the evaporation of the chloroform.

Crystals Containing Fluid.

Mr. J. B. Dancer lately read a paper before the Literary and Philosophical Society, of Manchester, Eng. containing a brief history of the discovery of fluids in crystals, including Sir H. Davy's chemical experiments on the fluids and gases obtained from the cavities in quartz crystals; Sir David Brewster's discovery of the pressure cavities in the diamond, ruby, emerald, amethyst, chrysoberyl, etc.; the existence of minute crystals in these cavities and the two new and remarkable fluids, which are immiscible, but sometimes found together in the same cavity—one a liquid hydro-carbon, named Brewstoline, the other Cryptoline; his experiments and examinations of artificial crystals deposited from aqueous solutions; his examination of the Koh-i-noor diamond and others in the East India Company's museum; and the geological speculations to which these discoveries gave rise. Mr. Dancer mentioned the experiments of his late father and others in producing artificial gems by intense heat, and stated that his own attention was drawn to this subject some twenty-four years since, by Sir David Brewster presenting him with a specimen of topaz containing fluid. Since that time he had examined a large number of crystals of various kinds, from the collections of friends, and had found fluid in quartz from South America, Norway, the Alps, Ireland, Snowdon, and the Isle of Man: and in fluor spar from Derbyshire; this latter specimen contained a considerable quantity of fluid, which burst the crystal of 180° temperature. [After this paper was written, Sir David Brewster informed the author that the fluid contained in crystals of fluor spar was water, and that the cavities burst at a temperature of 150°.] He suggested the employment of the microscope as a valuable assistance in detecting spurious from real gems; very few of the latter are perfect, and the flaws and cavities are so distinct in character from those which are so abundant generally in artificial gems that very little experience is sufficient for the purpose. This mode of testing of course is limited to transparent crystals, but might be employed when the usual methods are not practicable. He also mentioned Mr. Sorby's discovery of fluid cavities in the quartz of granite, in the quartz of volcanic rocks, and also in the feldspar ejected from the crater of Vesuvius, and Mr. Sorby's method of determining the temperature at which various rocks and minerals are formed. At the conclusion of the meeting, crystals containing fluid were exhibited under the microscope, and the expansion of the fluid by elevating the temperature of the crystal while under examination.—*Mechanics' Magazine.*

Compound for Destroying Burrs in Wool.

Patented by William H. Jubb, of Norwalk, Conn. The following are the ingredients for the compound for destroying the burrs: Sulphuric acid, one hundred parts, by weight; refined saltpeter, two parts, by weight, dissolved in the proper and sufficient quantity of water for the purpose regulated by the condition and nature of the wool. After the hard, knotty nature of the burrs is destroyed, which will be by the aforesaid compound, and they are reduced to a state of powder or pasty substance, I then use the following ingredients, compounded together, which will neutralize the injurious effects of the acids employed and completely cleanse the wool from the same and all other impurities, rendering the wool bleached to an excellent whiteness, without the least injury to the fiber: Sal-ammoniac, four parts, in weight; soda ash, thirty parts, in weight; whale-oil soap, ten parts, in weight; lime, five parts, in weight, dissolved in the necessary quantity of water to produce the desired effect. The utility of my compound for cleaning the wool from burrs and other impurities is in its economy; also in its freedom from the excessive and offensive smell when in operation, and the complete extermination of the burrs without the least injury to the fiber of the wool.

Preservation of Wood—Composition for Ships' Bottoms.

Mr. C. F. Raymond, of Norwalk, says he has used hot coal tar with great success in preserving from decay fence posts and other timber exposed to alternate wet and dryness. He places the posts in the boiling tar for a few minutes, then sprinkles them with clean sand. After setting the posts the portion above ground is paid over with hot tar and coated with sand.

He claims also to have a composition of which coal tar is the basis, designed to be used on the bottoms of vessels to prevent fouling and the ravages of the teredo. He claims that a vessel coated with it can make a voyage to the East Indies and back without, on her return, having a single barnacle clinging to her bottom or a worm in her timbers, except such as may have been in before the composition was put on.

Improvement in Artificial Stone, Stucco, Cement, etc.

George A. Frear, of Chicago, Ill., has obtained a patent as follows:—

"The nature of my invention consists in the use of an aqueous solution of gum shellac, or its equivalent, in cementing together particles of silex, alumina, calcium, or other mineral substances, to produce, artificially, a hard and durable stone, stucco, cement, or paint, for useful or ornamental purposes.

"My shellac solution is best obtained by boiling the gum-shellac of commerce in water previously made alkaline by the addition of any suitable alkaline salt, in proper proportion. The proportions of shellac, alkali, and water, may, and necessarily will, vary with the strength and quality of the solution required in producing various descriptions of stones, cements, etc.

"In the manufacture of artificial stones for building purposes, I use a solution obtained by first dissolving from two to four ounces of saleratus, potash, soda, or other equivalent alkali, in about one gallon of pure boiling water, and then adding thereto one pound of gum-shellac, boiling the mixture until the gum is entirely dissolved.

"A firm and durable stone, impervious to moisture, is produced by dampening a mixture of about one part of lime or cement and four parts of sand or other silicious material (with or without gravel or other ingredients) with my aqueous solution of shellac, and then firmly compressing the composition into molds of any desired form, either by suitable machinery or by hand, with mallets or tamping rods.

"The blocks or other articles thus produced will rapidly harden when removed from the molds, and in a few days are ready for building purposes. I prefer to obtain the compression of the material by percussion rather than by simple pressure.

"To produce a more perfect finish, I contemplate washing the surface or face of the artificial stone thus manufactured, five or six days after molding the same, with a weak solution of shellac dissolved in alcohol, ether, or spirits of turpentine (say about one pound of shellac in one gallon of the spirits).

"Instead of using a mixture of lime or cement, and sand, to produce an artificial stone, I contemplate moistening simple sand, clay, lime, chalk, or other earthy or mineral substance, as well as any combinations thereof, with my aqueous shellac solution, and the molding the same, by percussion, into suitable blocks or other devices, so that endless variety may be obtained therein at pleasure.

"To produce a mastic or stucco, I add so much of my shellac solution to lime, sand, clay, or any earthy or silicious material, or to mixtures thereof, so that the material or mixture shall be reduced by the solution to a pasty consistency, which can be readily worked and applied with a trowel. If then applied to any surface it will firmly adhere thereto, and, upon hardening, produce a firm, water-proof surface, which may be made to resemble stone so closely as not to be readily distinguished therefrom. By making the composition still thinner, it may be used as a substitute for paint, and it will also form a strong and adhesive cement for stone work, etc.

"Through a proper choice of the sand or other substances forming the basis of my improved artificial stones, etc., or by the use of coloring matter in connection therewith, nearly all descriptions of natural stone may be imitated, and any colors or shades of material obtained, at pleasure.

"In applying my improved stucco or mastic to buildings, whether of brick or stone, I first wash the surface with my aqueous shellac solution preparatory to laying on the composition hereinbefore described."

The Fine Arts as Applied to Industry.

The Paris correspondent of the New York *Times* describes a new kind of wall decorations for apartments, which is simply an imitation of the old tapestry work so much in vogue during the Middle Ages. The designs, it appears, are executed without weaving, in colors almost as indestructible as the originals from which they are copied. Close, as well as at a distance, the imitation is perfect, the hand and eye both being deceived.

The cloth which is employed for the ground work imitates in its texture the web of the old tapestry, it is composed of a white reps, and the sewings which are necessary to join the breadths for a picture of large dimensions, are made with great care, and follow the lines of the stuff, so that it is almost impossible to detect them, once the painting is finished. When the artist traces a line somewhat oblique with his brush, the effect on the raised lines of the cloth is a sort of a zigzag, like a woolen stitch on the canvas ground. The colors once laid in this way, he passes over them again with lines traversing the original ones, and thus imitates perfectly the web of the old tapestry.

In regard to the process itself, it is similar to that of water color painting, that is to say, it is the cloth itself which gives the lights, while in oil painting they are laid thickly on the canvas. The colors employed are the same as those used by decorative painters, but they are amalgamated by an albuminous composition which fixes them in the cloth so firmly that they become almost unalterable.

A French Patent has recently been granted for a new process for the production of sulphuric acid. Its great recommendation is that in the improved method all large leaden chambers are dispensed with. The sulphur or pyrites is burned in compressed air, and the sulphurous acid, first washed to free it from arsenic, etc., is then brought into contact with the nitric vapors in a small leaden chamber of peculiar construction.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING FEBRUARY 25, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat.....$10
On filing each application for a Patent, except for a design.....$15
On issuing each original Patent.....$20
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On filing application for Design (seven years).....$15
On filing application for Design (fourteen years).....$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $300 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

74,742.—HORSE BLANKET.—Seth W. Baker, Providence, R. I.

I claim a horse blanket, manufactured or made up of the fabric herein described, as a new article of manufacture.

74,743.—REVOLVING HAIR BRUSH.—Jabez Bayston, Chicago, Ill.

I claim the combination of the frame, A B D, the cylindrical brush, E, and the gearing for operating the same, and the elastic support, J, arranged and operating substantially as and for the purposes specified and shown.

74,744.—ROTARY ENGINE.—Jos B. Bennett, Brooklyn, N. Y.

I claim the arrangement of the springs around the wheels, D, D, with the pistons, E E, and cylinder, A, substantially as and for the purposes specified.

74,745.—SHOE NAIL.—James M. Bent, Wayland, Mass

I claim the cut shoe nail, with conical head, and tapering and parallel sides as described.

74,746.—KNOB LATCH FOR DOOR.—Albert Bingham, Newtonville, Mass. Antedated Feb. 7, 1868.

I claim the combination and arrangement of the latch, having link, B, and armed end, C, the removable tumbler, D, and spring, S, when the parts are constructed and operating substantially as described.

74,747.—SPRING BED BOTTOM.—Samuel F. Bouton, and Nathan P. Ames, Chicago, Ill.

We claim the combination of the arms, d and e, formed upon the coil of the spring, D, as shown, and a socket, c, applied or secured to the slat, C, in the manner and for the purposes specified.

74,748.—FARM GATE.—Henry H. Butler, Troy, Mich.

I claim 1st, The horizontal sliding bar, D, when constructed and operating substantially as and for the purpose set forth.

2d, The combination of the above with the rollers between the double posts E and F, the hangers, B C, with their rollers, and the gate, A, when arranged, constructed, and operating, substantially as and for the purposes described.

74,749.—MODE OF ATTACHING CIRCULAR SAWS TO THEIR MANDRELS.—Ela Calley, Franklin, N. H.

I claim the arrangement of the separate nut, C, and its confining screws, b b, shaft, A, the male screw, c, and the shoulder a, applied to such shaft in the manner and for the purpose substantially as specified.

74,750.—PISTON.—S. E. Chubbuck, and Isaac Y. Chubbuck, Roxbury, Mass., assignors to themselves and S. E. Chubbuck, Jr.

We claim, 1st, The peculiar construction of the ring sections, H, substantially as described and shown.

2d, The open-sided radial grooves, f f, in combination with the spring wedge, E, substantially as describ. d.

3d, The ings, a, in combination with the arms, c, to support those sections which work in a vertical or approximately vertical position, substantially as described.

74,751.—SEWING MACHINE.—Edwin E. Clark, Ann Arbor, Mich.

I claim, 1st, The slotted plate, C, constructed substantially as described, and for the purpose set forth.

2d, The needle-holder, E, constructed substantially as described, in combination with the slotted guiding plate, C, as and for the purpose set forth.

3d, The curved eye-pointed needle, F, operating in the arc of a circle, the center of movement of which corresponds with the plane of the movement of the cloth, and operated by means substantially as described.

4th, The looper, W, constructed and operated substantially as described.

5th, The combination of looper, W, and curved eye-pointed needle, F, when constructed and operating together as and for the purpose set forth.

74,752.—PAINT BRUSH.—Amos Cutter, Chelsea, Mass.

I claim the screw rod, g, when permanently secured on the handle, and forced downwardly by the female screw in the handle, f, in connection with the cylinder, b, as and for the purpose described.

74,753.—COAL STOVE.—E. A. De Camp, St. Louis, Mo. Antedated January 24, 1868.

I claim, 1st, The annular cooking top, C1 C2, in combination with the stove, A, substantially as described and set forth.

2d, The diaphragms B, and C3, when combined with the disks, C1 and C2, substantially as described and set forth.

74,754.—SULKY CULTIVATOR.—Elias S. Easterday, Nokomis, Ill.

I claim, 1st, Extending the plow beams, D, forward to form the tongue of the machine, substantially as herein shown and described, and for the purpose set forth.

2d, The iron frames, O, adjustably secured to each other, and sliding laterally upon a rod or equivalent slide attached to the axle, B, in combination with the plow beams, D, substantially as herein shown and described, and for the purposes set forth.

3d, The combination of the foot levers, Q, with the plow beams, D, and with the slotted irons or frames, O, substantially as herein shown and described, and for the purpose set forth.

4th, Adjustably securing the plows, M, to the standards, K, by means of sockets, N, substantially in the manner herein shown and described, and for the purpose set forth.

5th, The combination of the pivoted levers, E, chain, F, and pulley, G, with the plow beams, D, and with the plow beams, D, and with the bars, c1, connecting the forward ends of the bars, C, substantially as herein shown and described, and for the purpose set forth.

74,755.—MANUFACTURE OF TIN-LINED LEAD PIPE.—John Farrell, Pittsburg, Pa.

I claim, 1st, The die, e', in a plunger, e, in combination with a cylinder, a, and mandrel, d, in a machine for making tin-lined lead pipe, constructed and operated substantially in the manner and for the purposes hereinbefore set forth.

2d, The method hereinbefore described of constructing a compound ingot of tin and lead, in the manufacture of tin-lined lead pipe.

3d, The use of a flange, i, attached to the tin part of a compound ingot of lead and tin, for the purposes and in the manner substantially as above set forth.

4th, In the production of a compound tin and lead ingot by the method hereinbefore described, the use of a cover, g, for protecting the tin pipe or tin ingot from the heat of the molten lead, substantially as and for the purposes hereinbefore set forth.

74,756.—BURNING FLUID.—George W. Flowers, Jacob C. Happersett, and D. W. Happersett, Urbana, Ohio.

We claim the fluid prepared of the materials and substances as herein described.

74,757.—WORK TRIMMER FOR BOOTS AND SHOES.—A. V. Hill, Limestone, N. Y. Antedated Feb. 12, 1868.

I claim, 1st, The guard, c, when applied to a work trimmer, in manner and for the purposes substantially as described.

2d, The blade, B, fitted adjustably into a head, A, by the shank, b, as herein set forth, and for the purposes substantially as described.

74,758.—IMPLEMENT FOR MAKING EYELETS.—David K. Hoxsie, Providence, R. I.

I claim, 1st, The movable forming punch, No. 2, constructed with a cylindrical shape or former, e, a shoulder, i, a bevelled end, a, and a center cavity, t, when combined with mechanism so as to operate substantially as described, for the purposes specified.

2d, The stationary die, No. 2, constructed with a circular entrance, n, a conical drawing cavity, s, a throat, x, and an expanding cavity, r, at the rear, when combined with mechanism so as to operate substantially as and for the purpose specified.

3d, The movable cutting punch, No. 3, constructed in a tubular form, with a bevelled surface, g, and a concentric cutting edge, c, when combined with mechanism, such as herein described, so as to operate substantially as and for the purpose specified.

4th, The method herein described, of forming an eyelet by first converting a plan chet or disk of metal into a tube with a closed end, and then cutting out the closed end, and expanding this severed edge of the tube, to form the flange, by means substantially as described.

5th So combining a drawing punch and an open drawing die, constructed substantially as described, that the planchet of metal from which the eyelet is to be made, will enter in at the front end of the die, and, passing through, be delivered, completely formed into an eyelet at the rear end of the die, substantially as described.

74,759.—ANIMAL TRAP.—Samuel Huffman, Westfield, Ill.

I claim, 1st, The pivoted chamber, B, turning on its axis, furnished with two opposite openings, c c, and the lateral opening, D, as and for the purpose specified, or equivalent.

2d, In combination with revolving chamber, B, the auxiliary balls, as described.

74,760.—BREECH-LOADING FIRE-ARM.—Barton H. Jenks, Bridesburg, Pa.

I claim, 1st, Combining a vibrating slotted breech piece, D, a vibrating locking latch, E, and a hammer, F, in such manner that these parts are confined between the cheeks, B, of the frame, and the hammer is on the outside of the breech piece, substantially as described.

2d, Arranging the tumoler, G, between the cheeks of the vibrating breech piece, D, and affixing the hammer to one end of the tubular bearing of said tumbler, substantially as described.

3d, So combining a vibrating hammer, F, which is arranged outside of a vibrating breech piece, and between the frame cheeks, B, that said hammer can be full cocked or half cocked without moving the breech piece, substantially as described.

4th, Providing for cocking a hammer, which is arranged outside of and pivoted to the axis e, of a vibrating breech piece, by the act of drawing back the latter by means of an extension, b', or its equivalent, substantially as described.

5th, The relative arrangement of the breech piece, D, locking portion, E, tumbler, G, and trigger, H, the same being constructed and operating substantially as set forth.

74,761.—WHIFFLETREE.—Daniel W. Johnson, Bloomsburg, Pa.

I claim a whiffletree, having spring, A, slide, B, levers, H and M, chains, K, and button, C, constructed, combined, and arranged, substantially as specified.

74,762.—ANIMAL TRAP.—Wilmer W. Leech (assignor to himself and George Conrant), Pittsburg, Pa.

I claim the curved or bent and coiled wires, e e', one or more, single or double, in combination with the baiting and tripping devices, constructed and arranged substantially as and for the purposes set forth.

74,763.—KNIFE AND FORK SCOURER.—Mary Merrill, Marengo, Ill.

I claim the combination of the box, A, the inner casing, E, the sieves, B and C, and the cork or rubber, D, as and for the purposes specified.

74,764.—MANUFACTURE OF BUTTONS.—Lewis Moses, New York city, assignor to himself and James C. Walter, Harlem, N. Y. Antedated Feb. 7, 1868.

I claim, 1st, The cement consisting of liquid glass and finely powdered mineral matter, substantially as described, for the purpose specified.

2d, The plate, B, containing the cement filled into the circular recess in the button, A, and subjected to heat, as herein set forth, for the purpose specified.

74,765.—BRICK MACHINE.—Meltier Nye and Abraham J. Knisely, Chicago, Ill.

We claim, 1st, The combination of the movable fulcrum, F, connecting levers, E M and N, with rolling shaft, P, chain, R, and weight, s, substantially as and for the purpose shown.

2d, In combination with the movable fulcrum, F, the connecting rod, G, lever, H, chain, I, weight, y, and rod, J, substantially as and for the purpose shown.

3d, Combining the adjustable pivoted springs, f, with the hinged valves, g, substantially as and for the purpose herein shown and described.

74,766.—MILK AND PROVISION RACK.—Erasmus Osborn, Rome Center, Mich.

I claim the construction of a rack, as hereinbefore described, with perpendicular posts, A, transverse bars or feet, B, horizontal bars, C, cap, E, and rectangular pans, F, when arranged and operating substantially as and for the purposes described.

74,767.—SHEEP HOLDER AND FLEECE FOLDER COMBINED.—George Paine Washington, Ohio.

I claim the herein described sheep table, consisting of the top, B, sides, C, leaves, D, adjusting standard, F, and box E, all constructed and arranged to operate in combination with the apron, H, and roller, I, in the manner and for the purpose substantially as set forth.

74,768.—WATER ELEVATOR.—Wm. M. Palmer, Middlebush, N. J.

I claim, 1st, The ropes, F, cylinders, G, collars, G1, roller, H3, oscillating levers, H, and lever, I, combined so as to operate substantially as set forth.

2d, The bucket, A, swinging on the arm, D, and provided with the spring hook, K, arranged to operate substantially as set forth.

3d, The arrangement of the slides, C, arm, D, buckets, A, ball, E, and hook K, substantially as set forth.

4th, In combination with the cylinders, G, and collars, G1, the oscillating arms, H, substantially as described.

5th, In combination with the ways, B', and slide, C, the lever, I, arranged to operate substantially in the manner and for the purpose set forth.

74,769.—CONCRETE BRICK MACHINE.—Isaac Pardee, Vineland, N. J.

I claim, 1st, The arrangement of the levers, F and J, when the same are connected with the sliding box, D, in the manner set forth.

2d, The sliding box, D, in combination with the uprights, B, plate, C, pin, h, lever, F, chain, K, shaft, f, and lever, J, all made and operating substantially as and for the purpose herein shown and described.

3d, The box, D, when provided with a core, E, in combination with the sliding plate, L, that has grooves, e, and fits over strips, f, as set forth.

4th, The hinged platform, O, in combination with the box, N, and box, D, all made and operating substantially as and for the purpose described.

5th, The springs, d, when arranged as set forth, for the purpose of keeping the box, D, up, as set forth.

74,770.—COAL HOD AND SCREEN.—Amos Porter (assignor to himself and N. S. Payne), Charlestown, Mass.

I claim, 1st, The combined hod or ash pan and sifter, when it is made of two parts so constructed as that one half fits into or upon the other half, and the bored holes of the sifting bottoms are so arranged as not to come opposite to each other when one pan is put into the other, thus fitting the parts to set as a hot or ash pan, all substantially as described.

2d, The rotating holder or sifting frame to hold the two parts of the hod sifter together, in combination with the hod sifter, when all are constructed and used substantially as described.

3d, The stationary holder or hod frame, when constructed with balls or handles, in combination with the two containing vessels or pans, when bored in the bottoms, all substantially as described.

4th, The general construction and arrangement of the whole device, when made and used substantially as described.

74,771.—CORD RETAINER FOR PICTURES AND MIRRORS.—Wm. Read, Jr., Boston, Mass. Ant dated Oct. 10, 1867.

I claim the frame, a, provided with a projecting end or point, c, in combination with an elastic plate, b, as and for the purpose specified.

74,772.—MECHANICAL DONKEY.—Alfred Shedlock and Wm. Shedlock, New York city.

We claim, 1st, The combination of the cam wheel, K, made as described, with the spring, M, having a notched detent plate, N, attached thereto, for the purposes hereinbefore described.

2d, Also, in combination with the reacting spring, M, and a walking donkey, the independent or adjustable rider, Q, for the purposes hereinbefore set forth.

3d, Also, in combination with the feet of a walking donkey, the claw toothed shoes, S, or equivalent devices therefor, for the purposes hereinbefore set forth.

74,773.—SLEEPING CAR BERTH.—Wm. B. Snow, Chicago, Ill.

I claim the coil springs, L, enclosed in boxes between the floors of the car, in combination with pulleys, m n, cords G, and berths E, arranged substantially as set forth.

74,774.—PORTABLE GRINDING MILL.—Ambrose W. Straub, Philadelphia, Pa.

I claim securing firmly down together upon the frame, A B, cast in one piece, as shown and described, the detachable curb d', coping ring b', and hopper stool F, by means of four nutted screw bolts, a5 a5 a5 a5, substantially as and for the purpose herein described.

74,775.—CULTIVATOR.—C. F. Taylor, Vassalboro, Me.

I claim the A-shaped cultivator, A, with its center piece, a, and cross piece, a', in combination with the teeth, b, so arranged as to throw the earth inward, as and for the purpose described.

74,776.—COTTON CLEANER.—J. W. Thorn, Courtland, Ala.

I claim, 1st, Feeding drum F A, catch lever L C T, ratchet C R, and lug l g, the whole combined and constructed and operating in the manner and for the purpose above set forth and described.

2d, The lever L', catch C K, door D, and weight W, the whole combined in the manner and for the purpose above set forth and described.

3d, The combination of the drum F A, its catch lever L C T, and ratchet C R, and door D, lever L', and catch C K, and weight W, with a cotton beating and cleaning machine, the whole constructed and operated in the manner and for the purpose above set forth and described.

74,777.—MACHINE FOR SHEETING AND PRESSING TOBACCO.—Wm. H. Watson, New York city.

I claim, 1st, The combination of two or more endless metallic belts, constructed substantially as described, for the purpose specified.

2d, The combination of the side belts with the same, for the purpose specified.

3d, Slitting or cutting the tobacco while under pressure, substantially as shown.

4th, Adjusting the cylinders D and D2, substantially as shown and for the purposes indicated.

74,778.—FLUID METER.—J. W. Weller, Cleveland, Ohio.

I claim, 1st, The casks C C', arranged in combination with the vibrating box A, in the manner and for the purpose substantially as set forth.

2d, The faucets D D' and E E', handles G, and chain F, in combination with the cakes C C', levers H, and box A, when arranged and operated in the manner and for the purpose set forth.

3d, The supplementary box A', adjusting screws P, and bail B', in combination with the vibrating box A, for the purpose and in the manner as described.

4th, The registering apparatus, consisting of the gearing E', dial f, hands e d, and lever Q, when arranged and operated in combination with the box A, in the manner and for the purpose set forth.

5th, The vibrating box A, in combination with the ball I, and levers H H' substantially as and for the purpose set forth.

74,779.—BURGLAR ALARM.—I. M. Wells, Jeffersonville, Ohio.

I claim, 1st, The rotary match lighter C, applied to a burglar alarm, and operating by a complete revolution, substantially in the manner and for the purpose described.

2d, The combination of the match lighter C, with the key E, substantially as and for the purpose described.

3d, The match holder B b, mounted in the box A A', and arranged and operating substantially as described.

4th, The combination with the match holder B b, of the fuse N, as and for the purpose set forth.

74,780.—DETACHING CHECK REIN.—Abram Westbrook and Stephen O. Doan, Leona, Pa.

We claim, 1st, A cord attached to the check rein and extending back and confined in one of the driving reins, substantially for the purpose as described.

2d, The combination of a check rein with a cord for detaching and attaching the same, substantially as specified.

71,781.—PERMUTATION LOCK.—Anton Wetzel, Cincinnati, O.

I claim, 1st, In combination with the tumbler D, the miter wheels G H, by which the gated disks F F' F'' F''' F'''', are situated and operated at right angles to the operating handle I, of the lock, as described and for the purpose specified.

2d, The inclined headed bolt K K', pin L, spring O, and disks P p p', arranged and operating in the manner and for the purpose set forth.

74,782.—FIRE LIGHTER.—Levi H. Whitney, Vallejo, Cal.

I claim as an article of manufacture, a fire lighter, constructed of the parts arranged substantially as described.

74,783.—TRAVELER'S TRUNK.—John N. Wunderlich, Philadelphia, Pa.

I claim, 1st, The boot-rack made by the combination of the horizontal shelves, n n, and folding legs E, when arranged beneath a traveling trunk, in the manner shown and described.

2d, The trunk A D, opening as shown, when so combined with the folding legs E, that the cover a1 forms a bureau table, and the falling front, C, a writing desk, substantially as shown and described.

3d, The combination of the under mentioned parts, when so arranged in a traveling trunk as to form a toilet mirror n3, table a4, writing desk C, and boot-rack, n, in the manner shown and described.

74,784.—MEASURING AND TALLYING ATTACHMENT TO THRASHING MACHINE.—W. F. Abbott, Marengo, Ill.

I claim, 1st, The elevator box A, pulleys F F, belt m, and buckets e, in combination with the bifurcated spout C C', doors D D, measuring chambers M, and doors N N, all constructed, arranged and operating substantially as set forth.

2d, The combination of the pivoted doors D, pivoted lever d, and plate d', with the bifurcated spout C C', and measuring chambers M, substantially as and for the purposes set forth.

3d, The combination of the sliding bar, a, pivoted pawls, l, doors, N, having projections, i, double ratchet bar, h, springs, q, pointer, s, and register, R, substantially as described and represented.

4th, In combination with the above the key, w, substantially as described and for the purpose specified.

5th, The doors, D, substantially as shown and described, in combination with the bifurcated spout, C, and measuring chambers, M, for the purpose of alternately opening and closing said spout, all as set forth.

6th, The projections, i, in combination with the discharge door, N, of a grain-measuring chamber, substantially as shown and for the purpose specified.

7th, The bar, a, and its pawls, l, in combination with the ratchet bar, h, and projections, i, or other equivalent device, substantially as shown and described and for the purpose set forth.

8th, The ratchet bar, h, in combination with the tally-scale of the case, k, substantially as shown and described for the purpose of tallying grain, all as set forth.

74,785.—MACHINE FOR BORING POST HOLES.—A. Q. Allis, Dayton, Ohio.

I claim, 1st, The half nut, o', and the method of engaging and detaching the same from the boring bar, substantially as and for the purpose described.

2d, The tube, E, in combination with the auger, D, substantially as described for the purpose set forth.

3d, A post hole boring machine so constructed as to swing round on the platform, substantially as and for the purposes described.

74,786.—PILLOW SUPPORT.—Emeline T. Annis, Mount Morris, N. Y.

I claim the pillow, A, formed on the plate, B, the bracket, C, the rod, E, and the nut, g, arranged, combined and operating substantially as shown and described for the purposes set forth.

74,787.—TRAKETTLE.—Cornelius Anthony (assignor to C. L. Sanford, George B. Near and James Trover), Schenectady, N. Y.

I claim, 1st, The key or wedge, B, in combination with recess, C, and bail, D, and swinging cover of a teaketle, substantially as shown and described.

2d, The lug or ear, A, of a teaketle when made with slit e when made with slit e, when used substantially as and for the purpose shown and described.

74,788.—BUTT HINGE.—M. A. Avery, Groton, N. Y.

I claim the right and left butt hinge having the screw holes countersunk upon each side when its leaf, A, is provided with an opening between the socket, a, and abutment, b, for the application of the eye, c, of the leaf, B, as herein shown and described.

74,789.—BELAYING CLEAT.—Jonathan Bangs, South Dennis, Mass.

I claim the cleat, constructed as described, consisting of the lever, A, having upon its upper side the hook, H, and pivoted between the ears, a, of the plate, C, all operating as described whereby the tension of the rope upon the hook, H, forces the long arm, K, upon the rope beneath it in the groove of the plate, C, securely clamping said rope in position, as herein shown and described.

74,790.—WASHING MACHINE.—P. F. Bindewald, Strongsville, Ohio.

I claim the combination and arrangement of the lever, I, shaft, B, arms, C, connecting bars, D, pivoted levers, E, arms, G, and boaters, H, constructed as described with each other and with the box or tub, A, substantially as herein shown and described and for the purpose set forth.

74,791.—PREPARING FINELY-DIVIDED IRON, AND THE SEPARATION OF COPPER, SILVER AND OTHER METALS FROM THEIR SOLUTIONS.—Gustav Bischo, Jr., Swansea, Great Britain, assignor to himself and John L. Kidwell, Georgetown, D. C.

I claim, 1st, The preparation of finely-divided metallic iron, in the manner and by the process substantially as described.

2d, The combination and arrangement of the receiver, F, with the furnace for deoxidizing the ore or oxides of iron and securing the product from the oxidizing effects of the atmosphere, as set forth.

3d, The precipitation of metallic copper from its solutions by the use of finely-divided iron, prepared as described and in the manner set forth.

4th, The use of the finely divided metallic iron produced in the manner set forth for the manufacture of steel and for other manufacturing purposes.

5th, The use of finely-divided metallic copper produced in the manner set forth for separating silver from its solutions

74,792.—SHOE FOR CAR BRAKE.—James Brahn, Jersey City, N. J.

I claim, 1st, The shoe, B, cast with sockets, c, in combination with the plate, A, formed with projections, b a, substantially as described for the purpose specified.

2d, In combination with the above, the rubber strip, C, arranged substantially as and for the purpose set forth.

74,793.—LAMP BURNER.—Arthur W. Browne, Brooklyn, N. Y.

I claim, 1st, The combination of the tube, B, and tube or wick deflector, C, constructed and arranged as herein described, and adapted for the employment of two flat wicks which are thereby spread and curved and made to produce a circular flame, substantially as set forth.

2d, In combination with the elements covered by the first clause, the shafts, F F1, toothed wheels, f, and disk or operating device, F2, arranged and employed substantially as and for the purpose set forth.

3d, The gauze, G, in combination with the slotted wick deflector or tube, C, as and for the purposes set forth.

74,794.—HORSE RAKE.—E. W. Bullard (assignor to himself and J. W. Jenkins), Barre, Mass

I claim, 1st, The combination with a rake whose teeth are capable of being tilted or elevated in order to discharge the hay, of the stationary clearers, F, and vertical fingers, G, operating in connection with the rake, substantially in the manner and for the purposes herein shown and set forth.

2d, The combination with the axle and the rake teeth and thills hinged to the axle as described of, the horizontal fingers, F, and short vertical fingers, G, substantially in the manner and for the purposes shown and set forth.

74,795.—CATTLE PRICKER.—R. A. Carson and W. T. Peter, Brienesburg, Ky.

We claim, 1st, An apparatus for preventing cattle from lying down or jumping, substantially as shown and described.

The strap, a in combination with the pricking points, e', substantially as shown and described, and for the purposes set forth.

74,796.—CHURN.—C. H. Carver, Taunton, Mass.

I claim, 1st, The combination of the screw dasher, E, constructed as described, with the churn, B, having two or more inclined ribs or flanges, b', attached to its inner surface, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the clamp, H, constructed as herein shown and described, that is to say, with jaws, h1, bearing, h2, and arm, h3, with the dasher shaft, F, and crank wheel, I, as and for the purpose set forth.

74,797.—CHEESE BOX.—D. M. Cole, Elgin, Ill.

I claim, 1st, The combination of the outer and inner case, E and A, constructed substantially as and for the purpose specified.

2d, Connecting the cover and bottom to the rim and sides of a paper box by means of strips of textile substance, 1, 2, 3, 4, more or less, substantially as and for the purpose set forth.

74,798.—CLOTHESLINE HOLDER.—Albert Comey, Cuyahoga Falls, Ohio.

I claim the plate, B, with swinging cam, C, arranged in such manner as to operate by its own weight from either side, and flanged serrated roller, D, when combined as and for the purpose set forth.

74,799.—MODE OF TREATING MINERAL PHOSPHATES FOR THE MANUFACTURE OF FERTILIZERS.—John Commins, Charleston, S. C.

I claim uniting phosphatic minerals or earth with a solution of common salt, chloride of sodium, and water while hot, as and for the purpose herein described.

74,800.—CURLING IRON.—Samuel E. Condon, Brooklyn, E. D., N. Y.

I claim the curling iron, A, when secured in the metal case, C, by means of the catch, F, upon the case, fitting over the flange, G, upon the handle, B, as herein shown and described.

74,801.—DUSTPAN.—Samuel E. Condon, Brooklyn, E. D., N. Y.

I claim, 1st, The hinged cover, D, applied to the dustpan, A, and arranged in connection with the inclined flange, C, when a space is left between the hinge of the cover and the rear end of the pan, A, and when combined with the automatic coupling, all constructed, arranged, and operating as and for the purpose described.

2d, The automatic or self-acting coupling composed of the pivoted rod, E, secured to the bottom of the pan with a hook, f, at one end, and a weight, b, at the opposite end, and the staple, e, attached to the under side of the lid or cover, D, substantially as and for the purpose specified.

74,802.—RUNNING GEAR FOR WHEELED VEHICLES.—W. C. Cook, Appleton, Wis.

I claim, 1st, The combination of the reach, E, with the bounds, C C, of the front axle, A, the bearing places, a a, at the rear of the bounds, the pivoted rear axle, B, and the segment bar, c, with the front end of the reach connected to it by a staple, b, all arranged substantially in the manner as and for the purpose set forth.

2d, The construction of the metal stakes, G, secured to the bolsters, each by single bolt, f, arranged and applied substantially as shown and described.

74,803.—GLOBE VALVE.—Wm. S. Cooper, Philadelphia, Pa.

I claim, 1st, The combination of the central guide piece, G, cap, B, and body, A, substantially as herein set forth.

2d, The arrangement of the spindle, S, central guide piece, G, square shank, X, of the valve, V, with the cap, B, and body, A, substantially upon the principle as herein set forth.

74,804.—MODE OF SECURING LABELS TO GLASS-WARE.—Edward M. Davis (assignor to himself, J. B. Clark, and J. A. Hunter), Pittsburgh, Pa.

I claim, 1st, The process for countersinking a metallic substance in glassware, in manner and for the purposes substantially as described.

2d, The combination of the metallic substances, B and C, with the glassware, A, in manner and for the purposes herein set forth and described.

74,805.—GATE HINGE.—P. Dennis (assignor to himself and Geo. Leggette), Schuylerville, N. Y.

I claim the construction of the gate hinge consisting of the forked portion, D, having a socket in which the pintle, C, of the box, B, fits, said box carrying above the pintle, in the grooved guides, b, the roller, A, as herein described, for the purpose specified.

74,806.—CHANNELING TOOL.—F. E. Droll, St Charles, Mo.

I claim, 1st, The side bar, B, as united with main bar, A, for the use and purpose as specified and herein set forth.

2d, The adjusting my smaller knife, D, to the small or side bar, B, by means of the screws, independently of any other part of my machine, for the use and purpose as specified and hereinbefore set forth.

3d, My spring, E, as constructed, so that it may be moved up or down in main bar as a guide, for the use and purpose as specified and herein set forth.

4th. The entire combination of my knives, spring, and bars, with my mode of adjusting my knives and spring, for the use and purpose as specified and herein set forth.

74,807.—STRAP FASTENER.—S. W. Durham, Ipava, Ill.

I claim the strap fastener, constructed as described, consisting of the plate, B, having upon one of its sides the loops, C D, the latter bearing the tongue, E, whose inner end fits within the strap between the loops, C D, as herein shown and described.

74,808.—SHEEP SHEARING AND TAGGING TABLE.—Green Fenton, Streetsboro, Ohio.

I claim, 1st, The bottom, C, consisting of the sides, D, yokes, F, and straps, E, as arranged, in combination with the table, B, and adjustable neck block, G, for the purpose set forth.

2d, The sliding supplementary top, I, sides, J, pillow, K and extension legs, A, all constructed and arranged in the manner and for the purpose specified.

74,809.—FRAME FOR CARRIAGE TOPS.—James H. Flagg, Perkinsville, Vt.

I claim the carriage top frame consisting of two or more bows of metal or other suitable material, the side bows being hung on an internal one, and the whole jointed in the middle, in manner and for the purposes substantially as above set forth and described.

74,810.—BEEHIVE.—M. D. Fogel, Alpha, Ohio.

I claim the within-described hive, when its several parts, exclusive of the trough, are constructed, combined, and arranged as set forth.

74,811.—TRACK CLEANER.—A. A. Freeman and Sam'l Ford, Philadelphia, Pa.

We claim, 1st, Bed plate, B P, bearings, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10, shafts, T T' T'' and T''', brooms, C B C B' C B'' and C B''', shafts, S and S', bevelled wheels, V V' V'' and V''', geared wheels, G G' G'' and G''', all constructed, combined, and operating in the manner and for the purpose above set forth and described.

2d, The combination and arrangement of the screws, S C and S C', with the car frame, so as to give the proper dip to brooms, C B C B' C B'' and C B''', as above set forth and described.

3d, A track cleaner composed of the above-described parts, constructed arranged, and operating in the manner and for the purpose above set forth and described.

74,812.—BED BOTTOM.—J. C. Fry, Sidney, Ohio.

1st, The loops, b b, constructed as described, consisting of the wires, E E, open at their outer ends, and applied to the slat, D, by inserting their opposite ends from the under side through the holes in the end of the slats, and bending them down upon the top of said slats towards each other, where they are again bent and inserted in the top of the slats as herein shown and described.

2d, The single metallic strip, C, secured to the end or side rails, A, by the strip, B, and bent to form loops, a, whose sides pass through the strip, B, and whose inner ends rest against the inner side of said strip, as herein described for the purpose specified.

3d, Having the loops, b b, open in or near their center, as and for the purposes set forth.

4th, The combination of the loops, a, strip, B, loops, b, with central opening, elastic rings, F, as herein described for the purpose specified.

74,813.—REFRIGERATOR.—A. Fuller and L. P. Reichert, Buffalo, N. Y.

We claim the combination of the fan wheel, C, sliding grate, M, the tubes, O P and Q, and charcoal chamber, J, arranged substantially as and for the purposes described.

74,814.—HAY RAKER AND LOADER.—Merritt B. Fuller, Sanborn, N. Y.

I claim, 1st, The driving roller, B, provided with rows of curved teeth, b b, and intermediate teeth, a, which rest on the ground and support the roller in combination with the rake, c c, or equivalent, and endless carrier, C, operating substantially in the manner and for the purpose set forth.

2d, The guide blocks, i i, combined and arranged with the rows of teeth, b b, and the slats, g g, of the carrier, for retaining the latter in place and prevent slipping, substantially as specified.

3d, The guide board, J, constructed and arranged and operating in the manner and for the purpose specified.

74,815.—TOY.—A. C. Funston, Philadelphia, Pa.

I claim a toy, consisting of a case, having a glass top and containing figures or particles of paper, or equivalent material, to which movements may be imparted, substantially as and for the purpose described.

74,816.—THILL COUPLING.—Kingston Goddard, Richmond, N. Y.

I claim the spring, C, secured at one end to the bottom of the clip, D, and extending around the axle and clip, secured at its other end to the thill, B, forming a spring coupling, as herein described for the purpose specified.

74,817.—THILL COUPLING.—Kingston Goddard, Richmond, N. Y.

I claim the bending or forming of the outer end of the thill iron, substantially as shown and described, so as to be capable of being fitted to the under side of clip, in the manner as and for the purpose set forth.

74,818.—TRUSS.—Samuel Green, New York city.

I claim the combination and arrangement of the main plates, A A, hinged to the center plate, a, the stiff springs, c c, the slotted adjustable plates, B B, with cross-heads, g g, the pads, C C, and the light springs, b b, substantially as and for the purpose described.

74,819.—HARNESS MECHANISM FOR LOOMS.—J. Greenhalgh, Sr., Woonsocket, R. I.

I claim, 1st, The links, O, and hooks, R, constructed as described, when removably pivoted together by means of the notched pivot and slot, o', in combination with the slide, L M, cylinder, S, as herein described for the purpose specified.

2d, The combination and arrangement of the arms, F H I, and adjustable connecting rods, J K, sliding bars, L M, links, O, hooks, R, cylinder, S, pawl, V, slotted arm, U, and upper jacks, P, with each other, substantially as herein shown and described.

74,820.—CARRIAGE THILL.—S. B. Harmon, Portland, Me.

I claim the thill brace, b, when applied substantially as and for the purpose set forth.

74,821.—FIRE-ESCAPE LADDER.—D. Haynes and Wm. Free, San Francisco, Cal.

We claim the combination and arrangement of the curved and grooved arm, n, with hinged ladder, c', winding roller, I, rope, H', and platform, B, substantially in the manner shown and described, for the purposes set forth.

74,822.—MACHINE FOR CLEANING COTTON.—R. H. Hilton (assignor to Mitchell & Allen), Newbern, N. C.

I claim the S-shaped perforated plate, b, the perforated plate, d, the side plates having perforations, a, drawing-rollers, E E, and hinged screen, D, all constructed and combined to operate as herein described for the purpose specified.

74,823.—HARNESS-PAD TREE.—J. W. Hinman, Berlin, Wis.

I claim a harness pad tree having the two sides connected with a centerpiece by joints or hinges to render them flexible, substantially as and for the purpose herein described.

74,824.—GRAIN REGULATOR.—E. W. Hitchings, Potsdam, N. Y.

I claim, 1st, The combination of the revolving cylinder, A, and stationary cylinder, B, governor, D, cross bar, b, spindle, d, piston, E, and collar, q, substantially as set forth for the purpose specified.

2d, In combination with the above, the distributing plate, J, side pieces, K, and screw, S, said plate being attached to the revolving cylinder, A, substantially as shown and described.

3d, The hopper, M, substantially as shown and described, in combination with the cylinder, B, revolving cylinder, A, and piston, E, all as set forth.

4th, The guide, H, or the equivalent thereof, substantially as shown and described, in combination with a piston, E, of a cylindrical grain regulator, all as and for the purpose set forth.

5th, The adjustable feed collar, q, substantially as shown and described, in combination with the cylinder, B, and piston, E, all as and for the purpose set forth.

74,825.—TOY GUN.—Socrates Hubbard, Quincy, Ill.

I claim, 1st, Constructing the slide, D, of two heads, h h, an intermediate slip, j, and pendant projections, e f, whereby lightness, with strength and durability is obtained.

The stop, G, constructed and applied to the gun to retain the missile therein when the barrel is inclined downward, substantially as set forth.

3d, The combination of the elastic cord, C, slide, D, trigger, E, and stop, G, all arranged for joint operation, substantially in the manner as and for the purpose specified.

74,826.—SELF-RAISING FLOUR.—William C. Hughes, Scio, Mich.

I claim the preparation of self raising flour in the manner herein described.

74,827.—BUTTONHOLE CUTTER.—August Humann, New York city.

I claim the blade, F, having a tooth, e, formed at the rear end of its cutting edge, when said plate is laterally adjustable, in combination with the blade, E, provided with a stud, b, working in a slot in the shank, C, and secured in position by the thumb screw, c, all constructed, arranged, and operating as and for the purpose herein specified.

74,828.—TRUSS.—Charles A. Jefferies and E. F. Olds, Dexter, Mich.

We claim, 1st, The pad, A, provided with a rigid central projection as arranged in combination with springs, F, and belt, E, provided for the purpose and in the manner set forth.

2d, The pad, H, when constructed with a central adjustable projection or core, c, adjusting screws, I K, when arranged in combination with the cap, J, plate, G, and springs, F, in the manner as and for the purpose substantially as set forth.

3d, A pad, when constructed with a central air chamber, L, ventilating holes, e, and plate, N, in combination with the screw, O, and spring, F, when arranged in the manner as described and shown in fig. 7.

4th, The segment slide, D', segmental plate, E', and section or cap, C', when arranged and pivoted to the section, A', by an adjusting screw, F', working in and operating a central core, B', so that when the pad is turned around from one side to the other the said central projection or core, B', will always occupy the same direction from the center of the belt, in the manner substantially as described and shown in figs. 8 and 9.

74,829.—HORSESHOE.—Jas. Jorey, Westville, Conn.

I claim a calk for a horseshoe, provided with two edges, and constructed and applied to the shoe in such a manner that it may be detached and reversed and either edge adapted for use, as circumstances may require.

74,830.—MACHINE FOR CUTTING VENEERS.—Henry Kassing, New York city.

I claim the worm shaft, M, worm wheels, N, screws, M', and bar, G, upon the inclined guide, d, all constructed, arranged, and operating upon the laterally moving table, H, as herein described for the purpose specified.

74,831.—WAGON LOCK.—O. A. Kenyon, McGregor, Iowa.

I claim the slotted arm, F, of the lever, L, in combination with the pivot, a2, pawl, P, segment, R, connecting rod, a, and pivoted brake, C, as herein described for the purpose specified.

74,832.—MACHINE FOR POLISHING THREAD.—Peter Kerr, Paisley, England.

I claim, 1st, The machine for polishing thread, constructed and arranged substantially as herein described.

2d, The construction and arrangement of the polishing apparatus herein described, in which the thread is polished by means of rollers having grooves or indentations, said rollers working up against the thread, one inside and the other outside the bank, substantially as herein shown and described.

74,833.—COMPOSITION FOR CLEANING MILLSTONES.—Daniel Kindig, Newville, Pa.

I claim the aforegoing solution, prepared substantially as described for the purpose set forth.

74,834.—BOLT-MAKING MACHINE.—Wm. Klemm and Robert Dittrich, Pittsburgh, Pa.

We claim the keys, H and I, or their equivalent, arranged in relation to the other parts of the machine, and operated substantially as described and for the purpose set forth.

74,835.—HARVESTER.—E. E. Lewis, Geneva, N. Y.

1 claim, 1st, The reversible conveyer, E, when used to deliver grain from a reaping machine behind the finger bar, substantially as specified.

2d, A discharging apparatus for harvesters which will deliver the second swath from a reaping directly upon or so near the first swath as to form a double swath or windrow convenient to be loaded upon a wagon.

74,836.—HARVESTER RAKE.—C. Lidren (assignor to himself and E. Jackson), Lafayette, Ind.

I claim, 1st, The hinged platform, B, in connection with the elastic metallic bars, D, constructed, arranged, and applied in the manner substantially as and for the purpose herein set forth.

2d, The reciprocating rake, E, when operated from the wheel, K, of the main frame, through the medium of the jointed arms, h h', rock shaft, I, link L, and the slotted arm, J, on the axle of wheel, K, all arranged substantially as shown and described.

3d, The carriage, F, in which the rake head or rod, b, is fitted, in combination with the lever, F', curved bar, G, projection, L, pin, J, and the curved bar, M, all arranged to operate or adjust the rake, substantially as set forth.

4th, The hooks, N N', arranged as shown, and operated from the rock shaft I, through the medium of the lever, R, and the arm, m, on the rock shaft, all arranged substantially as specified.

74,837.—EGG BEATER.—Henry W. Louden, Ephrata, Pa.

I claim the arrangement of the double beaters, D d C C', pipe or sleeve, B, and spindle, A, with the pinions, a b, in combination with the box or cover, K T, cogged gear and handle, substantially in the manner and for the purpose specified.

74,838.—MECHANISM FOR OPERATING STATIONARY MACHINERY.—Galusha Maranville, Hampton, N. Y., assignor to D. A. Wilson and Ebenezer Gould, Jr.

I claim, 1st, Transmitting from one shaft, B, by intermediate gear wheels and shafts, C D E, motion to two revolving shafts, F and H, and to one oscillating shaft, G, all made and operating substantially as described, so that, from one driving shaft, three or more various machines may be operated, as set forth.

2d, The manner of converting rotary into oscillating motion by connecting a short crank, L, on the revolving shaft, F, by means of a rod, n, with a long crank, m, on the oscillating shaft, G, substantially as herein shown and described.

74,839.—DEVICE FOR FASTENING SHOE LACING.—Oliver H. Marston, Sandwich, N. H., and Moses L. Morse, Stoneham, Mass.

We claim, 1st, The base, a, having openings, i c, for the lacings to pass through, and having the ends, d, bent upward at any convenient angle.

2d, The spring, b, having the edges, f, which are parallel to the upturned edges, d, of the base, slightly bent downward.

3d, The combination and arrangement of the base, a with the spring, b, to operate together as specified.

74,840.—LITHOGRAPHIC PRESS.—Charles Maurice, New York city. Antedated Feb. 13, 1868.

I claim, 1st, The case, C, when arranged so that it can be adjusted for wider or narrower stones or blocks, substantially as herein shown and described.

2d, The case, C, when consisting of two pieces or halves, which are laterally adjustable on the frame, A, and when combined with the up-and-down adjustable frame or plates, H, all arranged and operating substantially as herein shown and described.

3d, The roller, D, when connected with the weighted frame, E, and with the stone or block, G, so that by rotary motions of the roller the latter will be moved over the stone; i. e., it will come in contact with and press upon each part of the paper and stone, and will not be drawn over the same, thereby insuring neatness of workmanship.

4th, The adjustable frames, C and H, in combination with the roller, D, and weighted frame, E, all made and operating substantially as and for the purpose herein shown and described.

74,841.—HUB AND AXLE.—Norman Maxham (assignor to himself and C. G. Robbins), Hancock, Vt.

I claim the sand head, D, in combination with the hub, A, and cover, H, and axle, B, substantially as shown and described and for the purposes set forth.

74,842.—ANIMAL TRAP.—William Miller, Chicopee, Mass., assignor to himself and John Boyle, Erie, Pa.

I claim the combination and arrangement of the weighted drop door, B, loop or catch, C, pivoted catch, D, having a bait hook, d', formed upon or attached to it, spring, G, standard or post, E, and curved guard plate, F, with each other and with the top or cover, A, substantially as herein shown and described and for the purpose set forth.

74,843.—WAGON COUPLING.—Henry Mitchell, Racine, Wis.

I claim, 1st, The method of coupling the reach, C, to the other running parts of a wagon or other wheeled vehicle by means of the front coupling, A, and the rear coupling, B, constructed and attached substantially as shown and described.

2d, The construction of the coupling box, A, having the sides thereof bent inward, so as to form the sockets, a, substantially as shown and described and for the purposes set forth.

3d, The flanges, c, upon the rear coupling box, B, in combination with the bolster, E, and the axle, F, substantially as shown and described and for the purposes set forth.

4th, The manner of adjusting the length of the reach, C, to the length of the load, substantially as shown and described.

5th, The forward coupling box, A, with the reach, C, and the hounds, D, in combination with each other and with the rear coupling box, B, and the axle, F, and bolster, E, substantially as shown and described and for the purposes set forth.

74,844.—SNOW PLOW.—George Place, New York city.

I claim the combination and arrangement of the knives, A A and B B, in sections, when combined with one or more plows, attached to the truck frame, and with the frames, E E E, of the truck, in the manner and for the purpose herein described.

74,845.—HARVESTER RAKE.—Abraham Quick, Wm. S. Opie, and Andrew J. Farrard, Raritan, N. J.

We claim 1st, A standard for a revolving rake and reel, with its base bolted directly to the inner end of a finger beam, having a rocking or rolling axle above the plane of the cutters between the finger beam and main frame, whereby the finger beam can rock axially, without disturbing its relation to the rake.

2d, The combination, substantially as described, of a revolving reel and rake with a standard bolted directly to the inner end of an axially rocking hinged finger beam, and without support on the main frame.

3d, Mounting a rake and reel, revolving on a vertical axis, on a finger beam hinged to the main frame by three joints, substantially as described.

74,846.—SELF-ACTING BOLT.—Thomas Rattenbury, Detroit, Mich.

I claim, 1st, The projection or thumb piece, C, working in the slot, E, by which the closing of the second door compels the bolt, B, to act.

2d, The combination of the above described parts with the frame, A, the spring, D, and the stem, F, when constructed to act automatically, substantially as described.

74,847.—HARVESTER.—James H. Redfield and Walter J. Cox, Salem, Ind.

We claim, 1st, The cutter bar, l, provided with the curved teeth, h, having their concave edges forming the cutters, in combination with the crank pulleys, j, upon the vertical shafts, k, gears, l, shafts, m m', bevel gears, n, shaft, o, pinion, p, and gear wheel, E, upon the axle, D, all arranged to operate as herein described, for the purpose specified.

2d, The endless bands, q q, when provided with the springs, bx, in combination with the gavel receiver, Ix, pinion, g, curved segment, w, shaft, wx, and crank, ax, all arranged and operating as described, for the purpose specified.

3d, The application of springs or elastic plates, bx, to the endless bands, q, for the purpose of discharging the cut grain into the grain receptacle, substantially as set forth.

4th, The pendant plate, l, when provided with the curved slots, f, in combination with the set screw, e, frame, H, and bar, A, all arranged and operating as described, for the purpose specified.

74,848.—BOOT CRIMPING MACHINE.—C. H. Rice, Port Henry, N. Y.

I claim the rotary boot trees, C, in combination with the jaws or pressure plates, D D' D'' Dx Dxx Dxxx, all being constructed and arranged to operate in the manner substantially as and for the purpose set forth.

74,849.—CAR VENTILATOR.—David C. Richardson, Lawrence, Mass.

I claim the combination and arrangement of the self-adjusting folders, d e, connected by the rod, j, in the open-mouthed space between the weather plates, b c, with the register plates, p p, substantially as and for the purposes herein set forth.

74,850.—SCREW CAP FOR OIL CANS.—William Rigg, London, England. Patented in England Feb. 6, 1867.

I claim, 1st, The screw cap for oil cans struck up from one piece of metal, and used as a seal, substantially as herein shown and described

2d, The combination of the faucet having a cutter upon it screw-threaded end, with the struck-up metallic cap and seal, substantially as described, for the purpose specified.

74,851.—BOOT AND SHOE SOLE.—Homer Riggs, Oxford, Conn. Antedated Feb. 12, 1868.

I claim the toe piece, A, and rear plate, B, as constructed, and the manner of inserting the oversole, E, and securing it for wear, so that it can be sprung in or out, substantially as and for the purposes herein set forth.

74,852.—GOVERNOR.—Ephraim P. Rogers (assignor to himself, R. W. Payne, and Hiram Pritchard), Corning, N. Y.

I claim the governor constructed as described, and consisting of the hollow slotted disk, A, having tubular stem, B, and neck, n, the weight, K, provided with stem, m, valve stem, C, swivel joint, f, cross bar, F, connections, G, levers, E, and balls, D, all arranged and operating as set forth.

74,853.—CARD SETTING MACHINE.—James Russell, Springfield, Mass.

I claim, 1st, A reversible stop ring, A, with its flanges, b b, its slots, c c, and its rolls, d d, and groove, a, constructed as herein described and for the purposes specified.

2d, In combination with the above, a pin or plunger, I, worked by the cam K, as and for the purposes described.

74,854.—BEEHIVE.—P. J. Severson, Knowersville, N. Y.

I claim, 1st, Separators, E, when constructed with top bar, G, and pins, H substantially as and for the purpose described.

2d, The double comb frames, D, in combination with spaces, a a' a'', and separators, E, substantially as herein set forth.

3d, Surplus honey box, B, with its cap or cover, C, and double comb frames D D, and separators, E, when constructed in the manner and for the purpose as herein described.

74,855.—PAN LIFTER.—Morrill A. Shepard, Bridgeport, Ill.

I claim a pan lifter consisting of the members, A a a' B C and D, the whole being arranged and operating substantially as herein described and for the purpose set forth.

74,856.—DUMPING WAGON.—Henry Shirey, Fond du Lac, Wis.

I claim, 1st, The revolving supporters, d d d d, cams, f, bar, g, lever, h, fulcrum, k, and brace, l, constructed substantially as described and operating as set forth.

2d, The bottom boards, b b, loops, c c, in combination with a body or wagon bed, when constructed and operating substantially in the manner and for the purposes set forth.

74,857.—OYSTER DREDGING MACHINERY.—Thomas P. Sink, Fairton, N. J., assignor to himself and J. F. Trenchard, Philadelphia, Pa.

I claim, 1st, The two rollers F, and G, arranged on the deck or gunwale of the vessel, for the boarding and tilting of the dredger, substantially as described.

2d, The combination described of the rollers, F and G, with the hinged bar, W.

74,858.—BOOT AND SHOE.—George Smith and Godfrey Smith, New York city.

We claim the ornamenting of boots and shoes by stitching a piece of leather or other suitable material to the inner side of the upper in such a manner as to form pockets or grooves between the upper and the inner material, to inclose cords of any suitable material, by which prominences are given the outer or external surface of the upper, substantially as shown and described.

74,859.—POCKET FOR BILLET STRAP.—Henry H. Smith, Wilmington, Del.

I claim a pocket, E, of metal or its equivalent, and at the lower edge of which is a perforated flange, for the purpose specified.

74,860.—CAR BRAKE.—W. H. Smith and Joseph Steger, New York city.

We claim the combination of the spring, K, cams, I I', constructed as described, ropes or chains, h, and pulleys, g, substantially as and for the purposes described.

74,861.—CLOVER HARVESTER.—S. L. Stockstill and W. H. H. Scarff, Medway, Ohio.

We claim, 1st, The suspended bed, C, in combination with the thills, J J, attached to the axle, A, and the shaft, L, placed on the thills, with the segment, M, on said shaft, the arm, O, hand lever, P, and pawl, Q, all arranged substantially as and for the purpose set forth.

2d, The comb teeth D, attached to the front end of the bottom, a, of the bed, in combination with the reciprocating bar G, operated substantially as shown and described, and provided with knives I I, which are provided with pendant pins m, to work in zigzag slots n, in one or more of the teeth D, of the comb, to give said knives a reciprocating motion as set forth.

74,862.—STREET PAVEMENT.—Henry M. Stow, San Francisco, Cal.

I claim a pavement composed of tiers of wedge-shaped wooden blocks, driven into a foundation bed of sand or earth, with spaces between said tiers packed with gravel, or sand and gravel, substantially as shown and described.

74,863.—LAMP.—Alvin Taplin, Somerville, Mass.

I claim my improved lamp burner, constructed with the annulus E to screw into the neck or cap of the oil reservoir D, and with the body A, connected with the annulus by a hinge only, the whole being in order that the body, by means of the hinge and the annulus, may be connected with the reservoir or its cap, in manner as specified, and the body be movable, relatively to such annulus, substantially as and for the purpose set forth.

74,864.—BREAD AND VEGETABLE CUTTER.—Hiram A. Titus, Gloversville, N. Y.

I claim arranging the plates B and D, in combination with the lever F, and knife E, all made and operating so that the knife will receive a slanting motion and the required pressure, substantially as set forth.

74,865.—CRIB ATTACHMENT FOR BEDSTEADS.—Harriet Ruth Tracy, New York city.

I claim the bedstead when cut away in the center of its side to receive the crib E, sliding beneath the bars c, and between the transverse guide bars D, attached to the frame of the bedstead, the front end board of said crib enlarged to overlap the cut portion of the side of the bedstead, as herein set forth for the purpose specified.

74,866.—SKATE.—Levi B. Tyng, Lowell, Mass.

I claim the combination and arrangement of the grooved stands c c, slots d d, screws or pins n n, spring seat e e, and springs f f, substantially as and for the purpose herein specified.

74,867.—ENVELOPE.—Sigmund Ullman, New York city.

I claim, 1st, The envelope formed with the end flanges or flaps F F, and the folded and interlocking edges m m, substantially as and for the purpose specified.

2d, The combination of the eyelets n n, and stamped or printed impressions v v, around them, when constructed and employed substantially as and for the purpose specified.

74,868.—TRIP HAMMER.—Charles Vogel, New York city.

I claim, 1st, The bars or rods Q, secured to the cross head P, of the hammer stem C, when said rods are attached to the angular arms B, upon the front end of the beam S, as herein shown and described.

2d, The block U, provided with the cam-shaped end X, when adjusted upon the beam S, by means of the slots V, and screw bolts W, as herein described for the purpose specified.

3d, The arrangement of the sliding pulley A4, or its equivalent, with the block U, and with the operating beam of the hammer, substantially as described for the purpose specified.

4th, The tightener frame A5, bearing in one end the driving pulley B5, arranged with the connecting rod C5, curved treadle D5, and spring K5 as herein described for the purpose specified.

74,869.—PEPPER CASTER BOTTLE.—Edward Wattis, Sr., Philadelphia, Pa.

I claim the pepper caster bottle, having a slide C, in its flat bottom, enabling the latter to be formed at the extreme lower end of the bottle, and increasing the capacity of the same, as herein shown and described.

74,870.—DRILL AND COUNTERSINK.—P. A. Whitney, Woodstock, Vt.

I claim, 1st, An adjustable tool for the drilling and countersinking holes, composed of the countersink, e, in two parts, and a drill D, between the same, adjusted by a key or its equivalent, held between the segment A and B of my chuck, by being screwed into a socket C, substantially as shown and described and for the purposes set forth.

2d, A chuck formed in segments, having two splines or channels, a and a, of different depths, in combination with any countersink, e, and drill D, substantially as shown and described, and for the purposes set forth.

74,871.—COSMETIC.—I. M. Wilson, Seguin, Texas.

I claim the composition of a cosmetic, substantially as herein described.

74,872.—SPRING BED BOTTOM.—E. E. Worden and H. Wilms, Brandon, Vt.

We claim the stays C, supporting the outer edges of the frame A B, the ends of the upper piece of the stay slotted to slide upon pins in the lower frame, and connected at its center f, to the upper frame, the lower piece of said stay secured at its center to the lower frame, and at its end to upper piece all operating as described for the purpose specified.

74,873.—CULINARY STEAMER.—G. W. Worster, Bangor, Me.

I claim, 1st, Combining with tank, C, a plurality of receptacles, b b b, substantially in manner as described and shown.

2d, Combining the receptacles b b, with the tubes a a, so that the tubes prevent the return of the condensed steam to the tank, substantially in manner as and for the purpose specified.

3d, Serrating the curbs or upper ends of tubes, a a, as shown at c c, substantially as and for the purposes specified.

4th, In connection with receptacles b b, a conductor l, substantially as described and shown.

5th, Combining with tank C, provided with fixed receptacles b b, a removable receptacle f, substantially as described and shown.

6th, The removable receptacle f, formed to fit vessels of various sizes by its outward flare, and provided with the interior rim g g, substantially as and for the purposes specified.

74,874.—STRIPPER FOR CARDING CYLINDERS.—Fletcher M. Abbott, Boston, Mass., and Edward F. Fields, Lewiston, Me.

We claim the mechanism, constructed and operating substantially as described, for moving and regulating the "stripper," as and for the purpose set forth.

Also, in combination with a "stripper," supported in a sliding bearing, a feed connecting and disconnecting mechanism, substantially as described and for the purpose set forth.

74,875.—APPARATUS FOR EVAPORATING SORGHUM JUICE AND OTHER LIQUIDS.—Hiram B. Avery, Bethel Township, Mich.

I claim the evaporator B, in combination with the steam chest A, when said chest is furnished with pipes, e g h and m, substantially as set forth.

74,876.—SOFA CRADLE.—Henry A. Axtell, Westfield, Mass.

I claim the combination of the swinging sofa cradle C, with the device for converting the cradle into a sofa, consisting of the adjustable screws, a a, and hinge E, constructed and arranged substantially as described.

74,877.—LATHE TOOL HOLDER.—John Baillie, Salem, Ohio.

I claim the holders C C, when used in combination with the slotted clasp B, and thumbscrew D, substantially as and for the purpose herein set forth.

74,878.—CLEANING CLOTHS USED BY BANK NOTE ENGRAVERS.—Haydn M. Baker, New York city.

I claim the use of coal tar, benzine, coal-tar naptha, or refined coal-tar light oils, for removing printers' ink from cloths or other fiber used by bank note and other engravers.

Also, the separation and recovery of the printers' ink and solvent by distillation, or any other method substantially the same.

74,879.—PLANT PROTECTOR.—Robert M. Bartlett, Storrs Township, Ohio.

I claim, 1st, A plant protector, consisting of the following devices, to wit: A hood A, of any suitable shape, when used in connection with the pole B, and suspending cord F, the whole being arranged and operating substantially as herein described and for the purpose set forth.

2d, In combination with the elements A a a' a'', C C' C'', B, and F, the ventilator D, and cap E e e' e'', as and for the purpose explained.

3d, The conical hood A, having one or more lighted openings or "bull's eyes" C, and adapted for suspension to a stack or pole, in the manner substantially as set forth.

74,880.—APPARATUS FOR BENDING METALLIC PLATES.—John W. Bean, Henry, Ill.

I claim the improved apparatus for bending and tempering plow and similar plates, when constructed and arranged in its several parts substantially as described.

74,881.—SOLDERING IRON.—Theodore Beardsley, Springfield, Mass., assignor to himself and J. Dana Wyman, Fitchburg, Mass:

I claim, 1st, A soldering iron, in which the point is heated by a flame fed by a reservoir of fluid contained in the handle or the instrument.

2d, The combination of the valve H, reservoir B, and head C, substantially as and for the purpose set forth.

74,882.—RAILROAD CHAIR.—L. B. Bidwell, Hartford, Conn.

I claim an improved railroad chair, constructed of plate iron, with a portion of the sides turned up at right angles to the bottom, in such a manner as to leave the bearing ends of the same width as the original plate, and to have the turned up portion carved out to the edges of the bearing ends, to increase their stiffness, substantially as specified.

74,883.—BOILER FEED LOW WATER DETECTOR.—Joseph N. B. Bond, New York city.

I claim, 1st, The buckling tube B, operating the alarm whistle F, by means of the arms D f, and connected with the boiler A, as shown, when arranged and operating as herein set forth and shown.

2d, The float H, operating the valve l, in the conical nozzle of the supply pipe I, which is provided with the nozzle n, and check valve o, in combination with the pipes h p, steam cock j, and buckling tube B, substantially as and for the purposes described.

74,884.—BELLOWS.—John Bowden and Walter Bowden, Bushwick, N. Y.

We claim, 1st, The arrangement and combination of the valves c*, s, l, m, and c, relatively to and with the forcing chambers C and B, and air chamber A, substantially as set forth.

2d, The cover a, of the air chamber A, connected therewith by an annular, flexible diaphragm, arranged for operation in connection with the forcing chambers B and C, substantially as specified.

3d, The arrangement of the side slots f*, between the fixed and yielding covers of the air chamber A, for admission of air to the forcing chamber B, through valve s, substantially as shown and described.

74,885.—PLOW.—Jeremy Bradley, Owatonna, Minn.

I claim the combination and arrangement of the plow A, standard B, and clasp C, in the manner and for the purposes herein specified.

74,886.—ANIMAL TRAP.—A. C. Briant, Lafayette, Ind.

I claim the combination of the box A, with its partition B, shaft H, having platforms I and J, inserted directly into said shaft, door K, above platform J, and operated by the rod G, and cord F, all constructed and used substantially as specified.

74,887.—ANIMAL TRAP.—Manlove Butler, Vernon, Ind.

I claim an animal trap constructed with the parts A A', B, C, and D, arranged as described, the oscillating wheel D being constructed with one loaded wing D', so as to act by gravity only, substantially in the manner set forth.

74,888.—BREECH-LOADING FIREARMS.—Cornelius Callaghon, Great Britain.

I claim the combination with central rib, substantially such as described, of two breech-blocks swinging outwardly therefrom.

Also, the combination with a removable frame of the breech blocks, substantially as described, so that when the frame is removed from the stock and the blocks released from the rib, the blocks are free to be removed from the frame, substantially as described.

74,889.—ANIMAL TRAP.—Charles R. Capps, Illiopolis, Ind.

I claim the combination of the disk A, sections b b1 b2 b3 b4, platforms k k1 k2 k3 k4, with their studs and springs, as shown, projection o, spiral spring d, casing h, and cage E, of an animal trap, as and for the purpose specified.

74,890.—BOOT AND SHOE LAST.—Charles F. Carr and Gilbert F. Holbrook, Norwich, N. Y.

We claim the sliding bolt, b, operated on as described and shown and for the purposes as substantially set forth.

74,891.—TIP SLED.—Stephen Chamberlin, Boston, Mass.

I claim, in combination with the sled runners, a body so mounted as to tip, substantially as described.

74,892.—HORSESHOE.—George T. Chapman, New York city.

I claim, 1st, The continuous detachable calk, B, combined with the part, A, substantially as described.

2d, The continuous detachable calk, B, and pin, C, in combination with the part, A, substantially as described.

74,893.—GRAIN DRYER.—Lewis S. Chichester (assignor to himself, G. H. Nichols and C. W. Mills), Brooklyn, N. Y.

I claim, 1st, The vertical air flue, a, in combination with the deflectors, e, platforms, c, and grain tables, platforms, or hoppers, substantially as and for the purposes set forth.

2d, The sections, g, having hopper-shaped openings and placed together, substantially as and for the purposes set forth.

74,894.—CARRIAGE JACK.—Olney Churchill, Canton, Pa.

I claim a lever jack, when constructed and operating substantially as shown and described.

74,895.—COMBINED MANURE FORK AND HOOK.—C. C. Cole, Phelps, N. Y.

I claim the special construction and arrangement of the divided socket, C, provided with the corrugations or grooves, b c, the spring pawl, l, and the circular bearing, B, the whole combined with the changeable fork head, A, and scraper, G, and operating in the manner and for the purpose herein set forth.

74,896.—VALVE FOR WATER CLOSET.—William S. Cooper, Philadelphia, Pa.

I claim a water closet valve comprising hollow piece, B, annular space, A R, and holes, E' and K and h h, all constructed and operated in the manner and for the purpose above set forth and described.

74,897.—SNAP HOOK.—J. C. Covert, Newark, N. J.

I claim, as an article of manufacture, providing the shank of the snap hook with a groove into which is dropped the sliding bolt, D, and loose spring, e, said groove being covered by means of the plate, G, and the bridge, I, which conceal, keep in place, and protect the spring and bolt, one end of the shank being so formed that it can be pivoted to a hold-back, when the several parts are constructed and arranged as and for the purpose set forth.

74,898.—APPARATUS FOR BLEACHING WITH SULPHUR FUMES.—A. J. Crosby and O. W. Crow, Bluffton, Ind.

We claim the box, A, with the doors, B B, vessel, C, having a regulating slide, D, and the bars, E E, the whole combined, arranged and used in the manner and for the purposes specified.

74,899.—APPARATUS FOR HEATING AND VENTILATING RAILWAY CARS.—D. H. Dotterer, Philadelphia, Pa.

I claim the within-described combination of furnace, boiler, air-heating chamber, and engine with the fan blower, or equivalent device, whereby a forcible current of heated or cold air is created and maintained through pipes which convey the air to and distribute it within the several cars of a railroad train, substantially in the manner described.

74,900.—RAILROAD RAIL JOINT SPLICE.—Edmund H. Eberman, Lampeter Square, Pa.

I claim the construction of the flanged and double dove-tailed brace and filling or plugs, B B' b b', used jointly or severally, in combination with the bolt, C, and nut, D, and dove-tailed slot, a, cut in the rail, all arranged in the manner shown for the purpose specified.

74,901.—SHOE TIP.—Alfred B. Ely, Newton, Mass.

I claim the use of resinous bodies combined with fibrous material and shaped by means of heat and pressure, substantially as described.

Also a shoe tip made of the foregoing substances and formed into shape by means of suitable pressure with or without heat, substantially as described.

Also a shoe tip made of felted or woven material saturated with resinous substances or prepared rubber which when properly heated and pressed in molds will assume the proper shape and acquire and possess the proper hardness and elasticity, substantially as described.

74,902.—WASHING MACHINE.—Levi S. Enos, Almond, N. Y.

I claim the pounders, D D, as constructed and arranged for receiving weights, J J, in combination with the friction rollers, a a, vertical stationary board, G, having series of holes, i i i, and corrugated hinged lid or cover, A, substantially as and for the purpose herein set forth.

74,903.—WATER WHEEL.—F. R. Ferris, Dora, Ind.

I claim the collar, H, in combination with the collar, E, arms, G, and gates, L L, the same being used substantially as and for the purpose set forth.

74,904.—TOY PISTOL.—Russel Frisbie, Cromwell, Conn., assignor to J. and E. Stevens & Co.

I claim the toy gun having its barrel provided with an orifice or vent, a, arranged in relation with the piston, C, to operate substantially as and for the purpose specified.

74,905.—ELECTRO MEDICAL BATTERY.—Herman Fritz, Cleveland, Ohio.

I claim, 1st, The battery case, when constructed in sections, A B, in the manner as and for the purpose substantially as set forth.

2d, The special manner of connecting the porous cups to the caps of cylinders by means of the shoulder, c', metallic screw collar or rim, c, and cap, S, in the manner substantially as described.

3d, The arrangement of the helices, T T', surrounding the cylinders, D E, and inclosing circular magnets, N, when said magnets are so arranged that they may be raised or lowered within said helices by an adjusting screw, Z, for the purpose and in the manner described.

4th, A case, constructed of metal or of any other suitable material inclosing the prime and induction coils, T T' and m' m'', for the purpose specified.

5th, The foot plates, B', provided with the heel, B', and adjustable toe cap, C', as arranged in combination with the battery case, in the manner as and for the purpose set forth.

74,906.—STOVE HEARTH.—William I. Fryer (assignor to himself and John P. Whitbeck), West Troy, N. Y.

I claim the open hearth plate, C, projecting from and externally to the fire-box of the stove formed with flanges and slides so as to carry in combination with it the ash pan or drawer, D, and replacing pan, H, as described.

74,907.—MANUFACTURE OF SOLID STEEL KNIVES.—J. W. Gardner, Shelburne Falls, Mass.

I claim a solid wrought-steel knife or fork with a skeleton or open handle and formed out of one piece of metal, substantially as described.

74,908.—FENCE.—Melvin J. Gaskill, Pleasant Plain, Ohio.

I claim the holding of the wires firmly in their places upon the battens by means of clinches turned upon the ends of the wires and driven into the battens, substantially as set forth and for the purposes specified.

74,909.—TREE FOR SIDE SADDLE.—Joseph B. Gathright, Louisville, Ky.

I claim, as an article of manufacture, a tree for a side saddle combining in its construction the following elements, viz: the bars, A A', flattened cantel, B, extension, D D', leather base, E, and block, F, said parts being respectively constructed and arranged in relation to the other parts of the tree, as herein described.

74,910.—FOLDING CHAIR.—H. S. Golightly and C. S. Twitchell, New Haven, Conn.

We claim, 1st, A cross-legged folding chair in which the back is hung upon pivots, or in an equivalent manner, so that it may move or swing independently of the seat and frame to adjust itself to the back of the person occupying the chair, substantially as herein shown and described.

2d, The combination with the back legs and the seat, whether rigid or flexible, of a folding chair of the front legs and a back pivoted or hung between the ends of said legs which extend above the seat so as to swing or move independently of the seat and legs, substantially in the manner and for the purposes herein shown and specified.

74,911.—COUNTING ATTACHMENT FOR THREAD-WINDING MACHINE.—William Grover, Holyoke, Mass.

I claim, 1st, A releasing plate or tripper in combination with the spool-removing mechanism of a thread-winding machine, as and for the purpose set forth.

2d, The notched adjustable plate, b, secured to the vibrating arm in combination with the traversing stud, a, substantially as described.

3d, The vibrating arm, b', supporting the pawl, c, springs, e and e1, and notched plate, b, in combination with the revolving dial plate, detent, m, and tension spring, g2, substantially as set forth.

4th, The combination of the adjustable stops, s, and pin, q, with the revolving dial plate or a revolving index, arranged and operating substantially as and for the purpose specified.

74,912.—INSOLE FOR BOOTS AND SHOES.—Artemus N. Hadley, Richmond, Ind.

I claim, 1st, The provision of the spar piece or counter, B, at the rear edge of an elastic insole, substantially as and for the purpose set forth.

2d, The combination of the sole piece, A, spar or counter, B, and protuberances, C, as and for the purpose set forth.

74,913.—RATTAN MACHINE.—Levi Heywood, Gardner, Mass.

I claim a central tube or "quill" provided with slots or openings in combination with a series of adjustable cutters, B, substantially as and for the purpose set forth.

74,914.—GEARING FOR LAMP TRAIN.—Robert Hitchcock and George A. Jones, New York city.

We claim, 1st, A gear wheel constructed of hard rubber or similar material possessing sufficient hardness with elasticity for gearing, for the purposes set forth.

2d, The combination of gear wheels made of hard rubber or other material uniting like hardness and elasticity, with metallic gearing in mechanical movements, for the purposes set forth.

3d, The combination in mechanical trains for supplying air to lamps of the hard rubber gear, c, with the fan-wheel screw shaft, substantially as and for the purposes set forth.

74,915.—GATE LATCH.—Simon Ingersoll, Mianus, Conn., assignor by mesne assignments to himself and Job Johnson.

I claim the gate latch, c1 c2, suspended by the two fulcrum pins, b1 b2, and moving between the plates, D and E, substantially in the manner and for the purposes set forth.

74,916.—STRAP HOLDER.—George B. Kirkham, N. Y. city.

I claim the body of the holder as adapted with the slide, the bent wire, b, and chain, c, at one end and as adapted with the catch and spring at the other end, all as herein described.

74,917.—FOLDING CRADLE.—Charles Klein, Albany, N. Y.

I claim the sections, B B, bottom, C, rockers, A A, and end pieces, D D, when the several parts are hinged together, as specified for the purposes set forth.

74,918.—TWEER.—Hugh Laird, Mechanicsburg, Pa.

I claim the combination of air chamber, A, valve recess, G, valve, H, plug, C, and lever, D, arranged substantially as described.

74,919.—WASHING MACHINE.—Alford Lamb, Jeffersonville, N. Y., assignor to himself, William H. Morse and Mary E. Layman.

I claim the auxiliary spring bottom, B, india-rubber strip, C, and fluted roller, D, all arranged substantially as and for the purpose described.

74,920.—ROCKING CHAIR.—James Lamb, Hubbardstown, Mass.

I claim the arrangement as well as the combination of the middle or zigzag and the side or leaf springs with the chair seat and base, substantially as described the whole being to operate as explained.

74,921.—HARNESS PAD PRESS.—G. W. Lawbaugh, Geneseo, Ill.

I claim the combination of the bottom plate, A, stirrup, C, screws, d d, top plate, B, and screw, F, constructed and arranged in the manner herein as shown and described, and for the purpose set forth.

74,922.—HORSE RAKE.—Ellis Luther, West Troy, N. Y.

I claim, 1st, The block, G, and cradle, P, in combination with each other and with the head of the rake, substantially as hereinbefore described and set forth.

2d, The combination of the dog, b, and the hook, c, with the cradle, P, substantially as hereinbefore described and set forth.

3d, The combination of the spring, d, with the hook, c, substantially as herein specified and set forth.

4th, The combination of the arm, N, with the cradle, P, and the lever, J, substantially as herein specified and set forth.

5th, The combination of the cord, T, with the dog, b, and axle, A, substantially as herein specified and described.

6th, The lever, J, the arm, N, the cradle, P, the hook, c, the hooked lever, a, and the spring, d, all arranged and combined substantially as and for the purposes hereinbefore described and set forth.

7th, The combination of the cradle, P, with the chain, e, substantially as hereinbefore stated and set forth.

74,923.—MACHINE FOR SHEARING YARN.—Caroline L. Lutton, Philadelphia, Pa., administratrix of the estate of E. T. C. Lutton, deceased.

I claim, 1st, The combination of the revolving blades, h, the knife, D, and a plate or projection, m, between which and the knife the yarn is caused to traverse, all substantially as described.

2d, The combination of the above with the guiding plate, E, and revolving tubular spindle, H.

74,924.—HORSE RAKE.—William McCord, Sing Sing, N. Y.

Antedated Feb. 14, 1868.

I claim the radius arm, c, made adjustable on the rake head, C, and operating in combination with said rake head, substantially as and for the purpose set forth.

74,925.—SPRING FOR RELAY MAGNET.—William N. McInnis, Northumberland, Pa.

I claim the construction of the irregularly and loosely coiled steel spring, C, when attached to and combined with the winding axle, B, and the armature, G, as herein described and for the purposes set forth.

74,926.—RAILWAY SWITCH STAND.—Alexander McLeod, Covington, Ky.

I claim the arrangement of stand, A A', a a', target, C C', switch bar, D, lever, E, shot bolt, F, ff', pedal, H, and spring, G, or weight, J, as and for the purpose set forth.

74,927.—STARTING CARS.—John McMurtry, Lexington, Ky.

I claim, 1st, The beam, c, when provided with slots, d d, and rack, b, operating substantially as and for the purpose set forth.

2d, The disk, J, provided with pins, s s, in combination with beam, c, substantially as described.

3d, The spring, c, in combination with pins, t, and beam, c, operating substantially as specified.

4th, The cog wheel, H, and double acting pawl, q, in combination with disk, J, arranged substantially as and for the purpose described.

5th, The friction wheel, f f, and pinions, n n, in combination with beam, c, operating substantially as set forth.

6th, The brake, g, provided with a slot and spring, m, in combination with friction wheels, f f, and pinions, n n, as and for the purpose specified.

74,928.—CORN HARVESTER.—Q. F. Messinger, Easton, Pa.

I claim, 1st, The rotating wheel, K, with its pins, i, in combination with the cutters, the bar, L, or its equivalent, and with a platform, so connected to the rear of the machine as to be adjustable laterally for the purpose described.

2d, The platform, R, consisting of a series of plates, n, in combination with the devices herein described, or the equivalent of the same for operating the said plates, all substantially as and for the purpose specified.

3d, The arrangement of the bent bar, M, and the wheel, K, as and for the purpose set forth.

74,929.—HARVESTER RAKE.—Lewis Miller, Akron, Ohio.

I claim the combination of two revolving telescopic arms, turning upon a center arranged on the platform at a, one of which carries a fork or rake, and is caused to slide on the other by means of a roller or guide traversing a camp path or way, D, formed by two raised marginal ledges, c c, also on the platform, and surrounding the center, a, substantially as and for the purpose described.

74,930.—STEAM GENERATOR.—Marcus Neumann, New York city, Valdemar F. Lassoe, Brooklyn, and C. W. Mac Cord, New York city.

We claim, 1st, A steam generator, provided or fitted with vessels, L, forming flue enlargements, arranged one above the other, and containing draft deflectors, M, in combination with water courses or generator-dividing plates, K, situated below the vessel, L, and having escape outlets or openings, l, in such manner as that water injected on to said vessels, or the upper one thereof, is converted into steam in its passage over them and the dividing plates, by the circuit given to the smoke and heated gases beneath and over the deflectors, substantially as specified.

2d, The combination of a sprinkler or feed water distributor, t, with the flue enlargements or vessels, L, containing deflectors, M, and water courses or generator-dividing plates, K, provided with escape outlets, l, for operation together as herein set forth.

3d, The combination, with the superheater, F, and arch, E, of the fire-box or chamber, of the cold air passage, f, arranged to communicate with the main or central flue, and constructed or supplied by suitable inlets from the outside, essentially as described.

4th, The feed water heater, N, arranged essentially as specified, and fitted with one or more flue-enlargements or vessels, L, containing deflectors, M, for operation in combination with a feed water sprinkler, e, or distributor, as herein set forth.

5th, In combination with a steam generator and separate heater, the automatic pressure regulator, interposed between the generator and superheater, and operating to supply the latter with steam on the pressure in the generator exceeding that in the superheater, as herein set forth.

74,931.—COMBINATION OF LIFE-PRESERVING AND SWIMMING APPARATUS.—Halvor Olsen, San Francisco, Cal.

I claim the combined use and application of the floats, and the extended ribbed and webbed gloves and sandals, constructed and attached to the user in the manner and for the purpose herein described and represented.

74,932.—BALLOT BOX.—Jesse P. Outcalt, Lancaster, Ohio.

I claim, 1st, The double spiral hopper, by which the balls are kept separate and conveyed to the tumblers in the manner described.

2d, The crescent-shaped tumblers, by means of which the balls are taken separately from the hopper and deposited in the drawer, as set forth.

3d, The spring, H, in combination with the slide, and tumbler for retracting the same, as set forth.

74,933.—MOSKETO CANOPY.—Isaac E. Palmer, Hackensack, N. J.

I claim the operating cord and holding stem, secured to the braces, D, and arranged to work through the tubular socket, A, of the ribs, B, whereby the canopy may be expanded from the exterior thereof, substantially as herein shown and described.

74,934.—HORSE HAY FORK.—Nelson Palmer, Albany, N. Y.

I claim, 1st, The combination of the tines, a and a', the braces, d and d', and the handle, h, when constructed and arranged substantially as and for the purpose set forth.

2d, The combination of the tines, a and a', and braces, d and d', the handle, h, the catch, g, and the roller, i, when constructed and arranged substantially as and for the purpose set forth.

3d, The catch, g, constructed and pivoted as described, so as to be locked by the action of the roller, i, against the catch, g, below its pivot, substantially as described.

4th, The roller, i, constructed as described, in combination with a catch, substantially as and for the purpose set forth.

74,935.—PROCESS OF SEPARATING COLORING MATTER FROM MADDER AND OTHER PLANTS.—Alfred Paraf, Boston, Mass.

I claim the compound process of liberating the coloring matter of plants from the ligneous matter by the solution of the cellulose, and the separation of the coloring matter from the insoluble compounds formed during the said solution, substantially as before set forth.

Also, the compound process of liberating the coloring matter of plants from the sugary and ligneous matters thereof by the removal of the sugary matter, the solution of the cellulose, and the separation of the coloring matter, substantially as before set forth.

74,936.—COMBINED BOILER AND HOT-AIR REGISTER.—B. B. Perkins, Chestertown, Md.

I claim, in connection with a boiler, arranged at the top or side of hot air flues in houses, the combination and arrangement of the perforated boiler top with the perforated cover, F, pivoted at f, the connecting rod, H, and the register, B, when the parts referred to are constructed and arranged substantially in the manner and for the purposes set forth.

74,937.—COFFEE-MAKING APPARATUS.—Julius Petsch, Hanover, Prussia, and Stephen N. Buynitzky, St. Petersburg, Russia.

We claim, 1st, A coffee-making apparatus, constructed with the shell, A, partition, B, strainer, D, and tube, C, or the equivalent of these parts, to operate in the manner set forth, and provided with the minute vent holes, e, through the partition, B, substantially as and for the purpose set forth.

2d, The coffee-making apparatus, constructed with a shell, A, partition, B, strainer, D, and tube, C, or the equivalent of these parts, in combination with the stand, E, or its equivalent, to support the said apparatus upon trunnions, n, and to the effect set forth.

3d, The coffee-making apparatus, as set forth in the next preceding claim, in combination with a device to extinguish the heating flame, substantially as set forth.

4th, The signal bell, n, in connection with and operated by the coffee-making apparatus set forth in the second preceding claim, substantially as described.

74,938.—LOOM.—William J. Quinn (assignor to Furbush & Gage), Philadelphia, Pa.

I claim 1st, The combination, with a drop-box, of a series of self-adjusting plates or cross pieces, c o1, c2, whereby the threads of the shuttles above that in operation are held above the fingers of the weft fork, substantially as and for the purpose described.

2d, The weft fork, provided with a recess, x, formed between the rod, m, and fingers, n, as and for the purpose specified.

74,939.—CAR WHEEL.—John Raddin, Lynn, Mass.

I claim, in combination with the web, a, the sectional hub, c c', and the bolts, g, constructed and arranged as shown and described, the elastic packing, b, and the bolts, substantially as and for the purpose set forth.

74,940.—MEDICAL COMPOUND OR BITTERS.—G. V. Rambaut, Petersburg, Va.

I claim the compound made of the materials and substantially as herein described and for the purpose set forth.

74,941.—CHURN.—John B. Raynor, Mazo Manie, Wis.

I claim the shaft, C, provided with a series of straight arms, H H, when arranged in combination with the box, B, having a series of rods, I I, in the manner and for the purpose set forth.

74,942.—MACHINE FOR GRINDING REAPER KNIVES.—Chas. Richardson, Auburn, N. Y.

I claim 1st, Making the top piece of the swing-frame, H, to which the cutter is fastened when the knives are to be ground, adjustable, and using the same in combination with the adjustable grindstone, in the manner and for the purpose substantially as described.

2d, Affixing the water tank or reservoir, P, to one of the standards which support the grindstone, so that the same shall at all times hang directly under said stone, and using the same in combination with an adjustable grindstone hung upon a movable plate or disk, substantially as and for the purpose described.

74,943.—CHURN.—W. C. Robinson, Saltsburg, Pa.

I claim the dasher, H, composed of the perforated hollow cone, D, the frame, F F, the cylinder, E, and the disk, G, as and for the purpose specified.

74,944.—UMBRELLA.—Edmund F. Schreiner, St. Louis, Mo.

Antedated February 17, 1868.

I claim an umbrella provided with a channel or conductor, secured to its lower outside edge, substantially as described.

74,945.—TABLE CASTER.—Daniel Sherwood, Lowell, Mass., assignor to Woods, Sherwood & Co.

I claim as a new and improved article of manufacture, a table caster, consisting of the parts a, b, c, etc., constructed substantially as described.

74,946.—ARTIFICIAL WINE.—John F. Seibenmann, Milwaukee, Wis.

I claim the production of wine from the ingredients, and by the process substantially as herein described.

74,947.—MEAT CUTTER.—John E. Smith, Buffalo, N. Y.

I claim, 1st, The combination of the central shaft C, the cutting knives E E, and the spring L, or its equivalent, substantially as and for the purposes herein described and set forth.

2d, The double eccentrics T and U, the bars or spring catches W and X, or the equivalent thereof, and the levers U' and T', when constructed and arranged substantially as and for the purposes described.

74,948.—MACHINE FOR SEWING BOOKS.—David M. Smyth, Orange, N. J., assignor by mesne assignments to John T. Lary, New York city.

I claim the combination of the needles with hooks at one end and eyes at the other, the needle or its equivalent with an eye at the upper end, and the traveling hook, the said combination having a mode of operation substantially as and for the purpose specified.

Also, the needles with a hook at one end for retaining the interlacing thread and an eye at the other for locking threads, substantially as and for the purpose described.

74,949.—WASHING MACHINE.—Daniel E. Somes, Washington, D. C.

I claim, 1st, The wheel and cylinder, as described, when operated together, substantially as and for the purpose set forth.

2d, The inclined floor of the box, in combination with the wheel and cylinder, substantially as and for the purpose set forth.

3d, The combination of the box, wheel and cylinder, with or without netting or gauze, as and for the purpose set forth.

4th, The wheel or rock shaft, with buckets, and the cylinder with means for heating the suds or generating steam, substantially as and for the purpose set forth.

5th, A washing machine substantially as described, with means for heating the suds and generating steam, in combination with a safety valve attached to said machine, substantially as and for the purpose set forth.

74,950.—HOSE COUPLING.—Joseph Steger, New York city.

Antedated Feb. 14, 1868.

I claim the teeth a a, b b, and set screw c, or its equivalent, in combination with the two halt couplings A B, constructed and operating substantially as and for the purpose set forth.

74,951.—RAILWAY SWITCH.—Wm. J. Stowell, Baltimore, Md.

I claim, 1st, The arrangement of the switch rail sections A' and B', between the turnout rail B, and the main track rail A, the former being laid so as to overlap the fixed main rail A, substantially as described.

2d, The spring b, or its equivalent, interposed between the rail B, and lever D, in combination with the connecting rod a, and switch sections A' B', substantially as described.

3d, A railroad-rail switch, constructed and operating substantially as set forth.

74,952.—MECHANICAL MOVEMENT.—William R. Swinnerton, Peoria, Ill.

I claim, 1st, The lever E, with its arms E, and all equivalents of the same, constructed and operating substantially as and for the purposes adecified.

2d, In combination with lever E, the slotted wheel as described, and the shafts L and G, constructed and operating substantially as set forth.

3d, The mode of adjustment and arrangement of the shafts L and G, herein set forth, in such manner that their relative distance from each other shall correspond to about one fourth the diameter of the wheel.

4th, The combination and arrangement of the various parts herein described and shown, for the purpose of producing accelerated speed in machinery.

74,953.—HAT RACK FOR SEATS.—Philo Sylla (assignor to himself, Wm. F. Sylla and Edwin H. Sylla), Elgin, Ill.

I claim the combination of the forked rack F F G, vertical pivot H, and support C D E, substantially as and for the purposes set forth.

74,954.—CHURN.—John Tingley, Philadelphia, Pa., assignor to Philadelphia Wood and Hollow Ware Manufacturing Company.

I claim the inclined diaphragm, arranged diagonally in the vessel, and held in place by the detachable cover b, all substantially as set forth.

74,955.—CHURN.—Jose Toll, Locust Grove, Ohio.

I claim, 1st, The arrangement of the three oppositely reciprocating dashers B B' B'', stems C C' C'', cross head D, double crank I I J J, and pitmen K L, for the purpose set forth.

2d, The perforated and vertically adjustable frame M M', socket N, and pins O O', for the object explained.

74,956.—BRICK MACHINE.—Benj. Van Vranken, Schenectady, N. Y.

I claim, 1st, The spring catch z4, rod g3, and rock shaft z1, for holding up one end of table E, in combination with the arm w, and press box section J arranged so as to operate substantially as described.

2d, Depressing the mold box table E, by an outward pressure of a hinged

section, J', or its equivalent, applied to the press box substantially as described.

3d, The application of a self-releasing follower to the mold box table E, substantially as and for the purposes described.

4th, Providing for a parallel adjustment of the bar K, by means of screws and pinion-spur wheels, substantially as described.

74,957.—RICE PLANTER.—Elijah Wagoner, Westminster, Md., assignor to himself and G. W. Mathews.

I claim 1st, The plows, E E, when constructed in the form described, and provided with the incline e, and guards, e' e', substantially as and for the purpose set forth.

2d, Connecting the coverer to the plow by a double joint h, as and for the purpose described.

3d, The coverer H, when constructed in the form described, and provided with the concave-formed edge, and a corrugated under surface, substantially as and for the purpose specified.

4th, The rod G, passing from the plow through the arm F, and provided with a screw and nut, by which inclination of the plow can be adjusted, substantially as specified.

5th, Constructing the seed conductors of the funnel form sections I I I, connected by straps i i, substantially as and for the purpose specified.

6th, The combination of the idler N, slide O, and roller K, substantially as and for the purpose indicated.

7th, The markers R R, when attached to the machine, and operating substantially as and for the purposes set forth.

8th, The arrangement herein described of a hoe and trencher outside of each of the supporting wheels.

74,958.—SALINOMETER POT.—Henry Wanklin, United States revenue steamer *Wilderness*.

I claim a salinometer, in which the specific gravity of the water is determined or measured by its pressure on a movable piston, substantially as and for the purpose set forth.

74,959.—FEED WATER HEATER.—George I. Washburn, Worcester, Mass.

I claim, 1st, The combination with the condenser C, arranged between the reservoir and pump of the surface condenser D, fig. 1, situated between the pump and boiler, substantially as described.

2d, The arrangement of the condenser between two pumps or two ends of the same pump, substantially as described.

3d, A steam pump and condensing apparatus, constructed and arranged substantially as herein described.

74,960.—BLANK FOR HOE.—Hervey Waters, Boston, Mass.

I claim a blank for shovels, hoes, etc., made substantially as shown and described.

74,961.—BORING FAUCET.—Alfred Weed, Boston, Mass.

I claim a tapping faucet having a combined valve and bit, arranged to operate substantially as set forth.

74,962.—SHOE.—Martin Wesson, Springfield, Mass.

I claim, as a new article of manufacture, a shoe, the upper whereof is composed of a woven or knit fabric, and having the "quarter" and the "vamp" of such upper, or either of them, formed of a web which is woven or knit of proper width to form the outside and the lining in one piece, whether such web is made tubular or flat, or with the lining attached to the outside by tying or connecting, substantially as specified.

74,963.—CONCRETE PAVEMENT.—Wells H. White, Troy, O.

I claim concrete pavements composed of the materials, and laid hot, and then rolled with a hot roller, substantially as set forth.

74,964.—PREPARING SCHOOL SLATES.—Lawrence Wiegel, Joseph Lehnbeuter, and Charles Fegers, Cincinnati, Ohio.

We claim an artificial slate made with a composition of liquid caoutchouc, asphaltum, and pulverized pumice-stone reduced to a thin paste with spirits of turpentine and applied to pasteboard by means of rollers, all substantially as and for the purposes specified.

74,965.—CORN SHELLER.—John R. Wilbur, Chicopee, Mass.

I claim, 1st, The V-shaped ribs, K, in combination with teeth or points, L, on the face of the cylinder, A, and bonnet, B, constructed substantially as described and for the purposes set forth.

2d, The crank, H, and shaft or arm, E, in combination with the hopper, D, constructed as described and for the purposes set forth.

74,966.—CORK PULL.—David Williamson (assignor to James Williamson), New York city.

I claim the cork drawer formed with a mortise, containing the sliding and pivoted cross bar, with its catch, and the spring for moving the bar crosswise to the mortise, substantially as specified.

74,967.—CLAY WASHING AND STONE SEPARATING MACHINE.—Ellis Wilzinski, Chicago, Ill.

I claim the tank, A, provided with partition, B, beater, M, and sliding gate F, with strainer, G, the whole constructed and operating substantially as and in the manner herein set forth, forming the clay washing and stone separating machine.

74,968.—ATTACHMENT FOR HOT AIR REGISTER.—James D. McBride, Mansfield, Ohio.

I claim in combination with an attachment for a hot air register, the water vessels, B and D, arranged in the manner and substantially as herein described.

Also the stand, F, when used for the purpose and in the manner substantially as herein set forth.

Also the combination of the several parts, A B C D E and F, for the purpose and substantially as herein described.

74,969.—RAILROAD CAR STOVE.—A. P. Winslow, Cleveland, O.

I claim, 1st, The water chamber or tank, B, and perforated water pipe, D, in combination with a railroad stove, substantially as and for the purpose set forth.

2d, The guards, a, in combination with a stove, substantially as and for the purpose set forth.

REISSUES.

2,874.—LAMP.—Chas. W. Cahoon, Portland, Me. Patented Dec. 3, 1861.

I claim, 1st, A lever with chimney fastenings, having that part of it on which the chimney rests extended, so as to form a deflector, substantially as described.

2d, The deflector, broad, flat-shaped, or nearly so, when filling the interior of the chimney, and combined with a air screen and ring with standards, substantially as and for the purposes specified.

3d, The combination of the said deflector with the conical foraminous piece or metal and the cylindrical tubular air screen, for the purpose of forming the air chamber, A, protecting the flame, and admitting the air from below the same, substantially as described.

4th, The combination with the lever for raising the chimney of the deflector, air screen, and foraminous piece of metal, substantially as and for the purposes specified.

5th, The ring surrounding the wick tube, a little above the top of the same, with the standards, s s, substantially as and for the purposes specified.

6th, A chimney holder having a projection for manipulating the same, chimney fastenings, a deflector, and a joint, substantially as and for the purpose set forth.

7th, The combination of the ring, f, supports, s s, and air screen, c, substantially as and for the purposes set forth.

8th, In combination with the burner of a lamp having a glass body, a metallic handle, as herein described.

2,875.—EYELETING MACHINE.—Wm. N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Patented May 14, 1867. Division A.

I claim, 1st, A reciprocating heading seat, constructed, arranged and operated substantially as described.

2d, A reciprocating piston or holding pin, in combination with the heading seat, when, constructed, arranged, and operated substantially as described.

3d, A spring piston rest, in combination with the reciprocating heading seat and holding pin, arranged and operated substantially as described.

4th, The reciprocating heading seat and piston, in combination with a vertical header, arranged and operated substantially as described.

5th, A reciprocating heading seat, in combination with a header and work supporting table, substantially as described.

6th, A heading seat, header, and work supporting table, in combination with a work feeding device, substantially as described.

2,876.—EYELETING MACHINE.—Wm. N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Patented May, 14, 1867. Division B.

I claim, 1st, A common receptacle or hopper, adapted and arranged for holding the eyelets when thrown in promiscuously, substantially as described, in order that they may be automatically discharged therefrom and delivered in proper position to the heading mechanism, for the purposes set forth.

2d, Agitating the eyelets so as to present them in proper position to the eyelet feeding mechanism, substantially as described.

3d, A promiscuous eyelet holding hopper, provided with means for delivering the eyelets in proper position, an eyelet feeding mechanism, and an eyelet heading mechanism, when combined and operating substantially as described.

4th, In combination with the above, a work supporting table, substantially as described.

5th, In combination with the element of the third claim and a work supporting table, a work feeding device, for the purposes described.

2,877.—EYELETING MACHINE.—Wm. N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Patented May 14, 1867. Division C.

I claim, 1st, A reciprocating punching table, constructed and arranged so as to be alternately removed and replaced, substantially as described.

2d, The reciprocating puncher, in combination with the reciprocating punching table, substantially as described.

3d, The combination of a puncher, a work holding table, and a work feeding device, substantially as described.

4th, The combination of a puncher and gage for the line of holes, substantially as described.

2,878.—EYELETING MACHINE.—Wm. N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gown Patented May 14, 1867. Division D.

I claim, 1st, The combination of a puncher and header with a movable punching table, substantially as described.

2d, The combination of puncher, header, work supporting table, and work feeding device, substantially as described.

3d, An organized eyeleting machine, in which the work is supported and fed along, the holes punched, the eyelets supplied, inserted, and headed down, substantially as described.

2,879.—EYELETING MACHINE.—William N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Dated May 14, 1867. Division E.

I claim, 1st, A puncher and header operating reciprocally, when combined, arranged and operating so as to strike alternately on or over the same fixed point, substantially as described.

2d, A reciprocating heading seat in combination with the puncher and header, when arranged and operating at the same fixed point, substantially as described.

3d, A laterally reciprocating punching table in combination with the puncher, header and heading seat, all arranged and operating at the same fixed point, substantially as described.

4th, The reciprocating punching table and heading seat so combined, arranged and operating as to alternately occupy the same place for punching holes and heading eyelets at the same fixed point, substantially as described.

5th, Supplying the eyelets from a common hopper to the heading seat or holding point by a belt and groove, substantially as described.

6th, The work-feeding device, constructed and arranged with an eyeleting machine, substantially as described.

7th, The adjustable gage in combination with the holding table for regulating the line of eyelets, substantially as described.

8th, Punching the holes and furnishing, inserting and heading the eyelets at the same fixed point automatically, by means substantially as described.

2,880.—EYELETING MACHINE.—William N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Dated May 14, 1867. Division F.

I claim, 1st, The combination of hollow rod, J, and lever, I, arranged and operating substantially as described.

2d, The combination of hollow rod, J, and piston, K, arranged and operating substantially as described.

3d, The combination of hollow rod, J, piston, K, and lever, I, arranged and operating substantially as described.

4th, The combination of rod J, piston, K, spring, l', and lever, I, arranged and operating substantially as described.

5th, The combination of rod, J, piston, K, lever, I, and header, C, arranged and operating substantially as described.

6th, The combination of hopper, N, with eyelet-feeding mechanism and rods, J and K, and header, C, substantially as described.

7th, The combination of puncher, B, and sliding plate, U, substantially as described.

8th, The combination of plate, U, and levers, V and I, substantially as described.

9th, The combination of puncher, B, header, C, sliding plate, U, and rods, J and K, substantially as described.

10th, The combination of puncher, B, header, C, plate, U, rods, J and K, hopper, N, belt, R, and groove, X, substantially as described.

11th, The combination of table, U, and pawl, Y, substantially as described with the set, or punch and set, of an eyelet machine.

12th, The combination of hopper, N, with bristles or flexible arms, o, substantially as described.

2,881.—BASE BURNING STOVE.—Dennis G. Littlefield, Albany, N. Y. Dated August 18, 1863. Reissue 1,594. Dated December 22, 1865.

I claim, 1st, The devices described by means of which the magazine and each of the several sections of which it is composed are held in their proper positions while at the same time the several parts are so adjusted as readily to admit of being separated and reunited at pleasure.

2d, The corresponding notches or shoulders in the iron cylinder and the lining as described by means of which the lining is held in its place, notwithstanding the greater expansion of the cylinder by heat and without danger therefrom.

3d, The magazine, constructed as described, in combination with the furnace separated from it and suspended within a chamber isolated from the chamber surrounding the magazine.

4th, The combination of a magazine contracting in diameter from the middle or other line downward to its lower end with a furnace suspended within a chamber isolated from the chamber surrounding the magazine.

5th, The devices described by means of which I am able to construct what I denominate the upper and lower sections of the burner, each complete in itself separately and so to adjust them as to admit of their being conveniently separated and reunited without injury to either.

6th, The intercommunication to be opened and closed at pleasure between the chamber of a magazine coal burner which surrounds the furnace and that which surrounds the magazine.

2,882.—LAMP.—Wm. N. Ely, Stratford, Conn., assignee by mesne assignments of L. Bailey and R. Thayer. Patented May 4, 1858.

I claim, 1st, Suspending the body of the lamp within an outer case, so arranged that the air shall pass within the case and around the lamp body to the flame, substantially as described.

2d, A hollow lamp case, pedestal, and base, constructed and arranged in relation to the lamp body substantially as described.

3d, An annular lamp body in combination with an outer case, substantially as described.

4th, Constructing and arranging the parts so as to deflect the air coming up from outside the lamp body toward the flame, substantially as described.

5th, Supplying air to the flame by means of the channel formed between the body of the lamp and the outside shell or case, substantially as described.

6th, Arranging and using the rod or wire, K, in relation to the flame and hollow pedestal and outer case, substantially as and for the purposes described.

7th, The concavo-convex button constructed and arranged substantially as and for the purpose described.

2,883.—TUMBLER WASHER.—John Solter, Baltimore, Md. Patented Sept. 4, 1866.

I claim, 1st, In a tumbler washing machine, operating the valve, e, by pressing the tumbler, in seating it, in the manner as shown and described and for the purpose set forth.

2d, The combination of the lever, K, and valve, e, constructed and operated in the manner substantially as shown and described and for the purpose set forth

2,884.—HAY KNIFE.—Philo O. Soper, San Francisco, Cal. Patented Jan. 29, 1867.

I claim, 1st, The construction of the blade, B, substantially as described.

2d, The bearing of the shank, C, in connection with the angle given to the edge of the blade, B, substantially as and for the purpose described.

3d, The point, A, substantially as and for the purposes above described.

2,885.—LAST.—Ambrose Taylor, Osawatomie, Kansas. Patented Nov. 5, 1867.

I claim, 1st, The spring hook, E, secured by its shank, F, in the block, B, and engaging with the hook C, set in the last A, all constructed and arranged to operate as herein set forth, for the purpose specified.

2d, The prevention of lateral or backward movement of the block, B, by having the hook, C, extend upward above the surface of the upper side of the last, and within a recess in the under surface of the block, B, substantially as shown and described.

DESIGN.

2,940.—CLOCK FRONT.—Amos Wilder and Cyrus W. Strout, Boston, Mass.

NOTE.—FIFTY-SIX patents in the above list were obtained through the Home Office of the Scientific American Patent Agency.—EDS.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & CO., *37 Park Row, N. Y.*

59,395.—HAND STAMP.—B. B. Hill, Chicopee, Mass. Dated Nov. 6, 1866. Reissue No. 2,836. Dated Jan. 14, 1868. Application for reissue received and filed Feb. 8, 1868.

1st, I claim, in combination with the type wheel or wheels and inked ribbon of a hand stamp, a series of characters arranged in a circle concentric with the face or periphery of the type wheel and revolving with and always occupying the same relative position to the characters upon the printing face of said type wheel for the purpose of indicating to the operator the figures or characters to be stamped, substantially as described.

2d, I claim the base, G, having the projecting rim, U, and the axis pin, a, and the face plate, P, the whole forming a wheel case or protection for the type wheels, when constructed and arranged substantially as herein described and set forth.

3d, I claim the wheels, K K', arranged upon the same axle with the wheels, I J, in combination with a hand stamp, arranged and operating substantially as described.

4th, I claim the bracket, H, made on or secured to the case, G, having a step, c, or its equivalent, to enter the lower end of the spindle, and orifice for the screw, c, for attaching and detaching said case to the spindle, E, substantially as and for the purpose described.

5th, I claim the flange, K, in combination with the chase, L, for the purpose of easily and quickly attaching the type plate to or detaching it from a hand stamp, when constructed and operating substantially as herein described.

59,388.—MEDICAL VACUUM CHAMBER.—George Hadfield, Cincinnati, Ohio. Dated Nov. 6, 1866. Application for reissue received and filed Feb. 8, 1868.

I claim the employment of a hand support or rest, substantially as and for the purposes set forth.

I also claim the sealing cap, F, substantially as and for the purposes set forth.

39,043.—FIRE GRATE.—W. D. Guseman, Morgantown, West Va. Dated June 30, 1863. Application for reissue received and filed Feb. 8, 1868.

1st, I claim the sliding blower or screw in combination with the grate, for the purpose specified.

2d, The damper in combination with the flue, sliding blower or screen and grate, all arranged substantially in the manner as and for the purpose set forth.

54,662.—RAILWAY CAR.—E. H. Ashcroft, Lynn, Mass. Dated May 15, 1866. Application for reissue received and filed Feb. 11, 1868.

I claim a safety car constructed with a water space with one or more showering pipes and a fusible plug apparatus, arranged substantially in manner and so as to operate with respect to the car chamber, as specified.

I also claim, in combination with a water space, substantially as herein set forth, a heating apparatus and circulating pipes, whereby the water shall be caused to circulate substantially upon the principle as herein set forth.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* *MUNN & CO., Solicitors of Patents, 37 Park Row N. Y.*

EXTENSION NOTICES.

Thomas A. Steadman, administrator of the estate of Thomas S. Steadman, deceased, of Lyons, Mich., having petitioned for the extension of a patent granted to the said Thomas S. Steadman the 23d day of May, 1854, and reissued in three divisions the 19th day of June, 1860, respectively numbered 985, 986, and 987; No. 985 was again reissued the 5th day of June, 1866, and numbered 2,279, and No. 987 was again reissued the 20th day of June, 1865, and numbered 2,069; for an improvement in clover and grass seed harvesters, for seven years from the expiration of said patent, which takes place on the 23d day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 4th day of May next.

Frederic Howes, of Boston, Mass., having petitioned for the extension of a patent granted to him the 29th day of June, 1854, for an improvement in extra yard to topsails, for seven years from the expiration of said patent, which takes place on the 20th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 1st day of June next.

George T. Bigelow, administrator of the estate of Samuel Nicolson deceased, of Boston, Mass., having petitioned for the extension of a patent granted to the said Samuel Nicolson the 8th day of August, 1854, for an improvement in wooden pavements, for seven years from the expiration of said patent, which takes place on the 8th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of July next.

NEW PUBLICATIONS.

LAW REGISTER AND OFFICIAL DIRECTORY. Merchants' Law Company, publishers, No. 128 Broadway, N. Y.

For lawyers, collectors, and business men of almost all other professions, the Directory just issued is of great importance. It contains the names and residences of over 85,000 lawyers and public officers, and has the following interesting statistics: Of the lawyers (37,295) and of the officials (48,350) whose names are contained in this work, 2,960 of the former are on the retired list and 2,350 occupy judicial positions, which leaves 31,986 in actual practice. It is estimated that the earnings of each average $2,000 per annum, making a total expenditure for law in this country of over sixty-three million dollars a year. The work contains over 1,000 pages, is published in law binding style, and will be found a useful work for reference to all classes of business persons.

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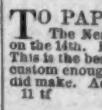

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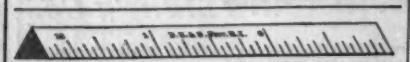

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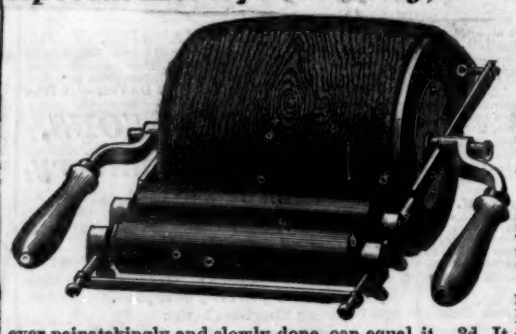

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